nited States Forest Service
epartment of Agriculture
orthern Region

BEAVERHEAD-DEERLODGE NATIONAL FOREST NOXIOUS WEED CONTROL

Final Environmental Impact Statement And Record of Decision

May 2002

Prepared by: USDA Forest Service, Beaverhead-Deerlodge National Forest
Responsible Official: Gary A. Morrison, Acting Forest Supervisor

R1-02-43

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten building, 1400 Independence Avenue, SW, Washington D.C. 200250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

United States
Department of
Agriculture

Forest Service
Northern Region

Record of Decision

For the

Noxious Weed Control Program Environmental Impact Statement

Beaverhead-Deerlodge National Forest
Beaverhead, Butte-Silver Bow; Anaconda-Deer Lodge, Granite, Jefferson, Powell, and Madison Counties, MT

May 28, 2002

R1-02-43

Introduction

This Record of Decision explains my decision and rationale for selecting Alternative 1 as described in the Beaverhead-Deerlodge National Forest (BDNF) Noxious Weed Control Program Final Environmental Impact Statement (FEIS). Impacts are documented in the Beaverhead-Deerlodge National Forest Noxious Weed Control Program Final Environmental Impact Statement (FEIS). The project is located on about 16,019 acres of weed infestations on the 3.3 million acre Beaverhead-Deerlodge National Forest as shown on maps, by District, in Appendix B of the FEIS.

I am the Responsible Official for the decision outlined in the Record of Decision. The following are the decisions I am making for the Noxious Weed Control Program:

1. What level of weed control to implement on the BDNF.
2. Where and what kind of weed controls will be used.
3. What measures will be required to appropriately implement weed control methods.
4. Whether aerial application of chemical herbicides will be authorized.

Forest Plan Direction and Reason for My Decision

Both the Beaverhead and Deerlodge National Forest Plans direct control of noxious weeds as priority items (Page II-9, BNFP; Page II-3, DNFP). The Beaverhead National Forest established an aggressive noxious weed control program to be continued and expanded to reduce or eliminate weeds (II-37).

Noxious weeds are increasing and expanding their range. This knowledge is uncontested. We expect the pattern of expansion to continue through transportation of seeds from increasing commercial and recreational travel across the BDNF and through continued disturbance on all lands (agricultural, residential, recreational and commercial developments). The spread of weeds from non-Forest lands inside and adjacent to Forest land will also contribute to increased weed infestation. The number of invader species and their distribution will increase if we do not treat weeds.

Although less than one percent of the BDNF is now infested with weeds, past experience shows weeds become epidemic when an aggressive weed control program is delayed. The Lolo, Bitterroot, Flathead, Kootenai National Forests, for example, comprise 87% of infested acres in Montana, North Dakota and parts of South Dakota. Weed infestations affect 16% of the Bitterroot National Forest lands. The BDNF shares boundaries with the Bitterroot and Lolo National Forests on the north and west sides, which increases the urgency for adopting an aggressive weed control program.

The Beaverhead National Forest in 1987 and the Deerlodge National Forest in 1989, implemented weed control programs to manage weed infestations. However, weed infestations in inaccessible areas have increased over the last decade because they were left untreated. Infestations in accessible areas on the Forest are mostly contained or suppressed. This proposal would allow Forest weed coordinators the option to use the most appropriate and effective tools to suppress or control weeds when appropriate, in order to protect biodiversity and enhance native vegetation on the BDNF.

Weeds in steep and remote terrain on the Forest, such as the divide between the Bitterroot and Big Hole Valleys, are currently left untreated because aerial spraying is not authorized under existing weed control plans. Sensitive alpine soils limit mechanical treatment in some areas and the cost of labor for hand pulling is prohibitive. (See Economic Analysis on page 2-6).

The nationwide emphasis on noxious weeds has resulted in the development of better, more effective chemicals. Alternative one provides the flexibility to use new herbicides and biologic controls tested and registered by the Environmental Protection Agency. It also provides districts with the ability to treat new sites and new invaders in a timely fashion under this Decision.

I select Alternative 1 as presented in the Beaverhead-Deerlodge National Forest Noxious Weed Final Environmental Impact Statement (FEIS) on page 2-2. With this decision I authorize the implementation of an integrated weed management strategy for the Forest, which includes aerial application of herbicides. Additional changes incorporate the use of new herbicides registered by the Environmental Protection Agency and treatment of new weeds not considered in previous analyses.

Public Involvement

The public was extensively involved throughout the development of this EIS. Public comment was used to define issues and develop the range of alternatives for accomplishing management goals and objectives. The Weed EIS was listed in the Quarterly Project List on April 1, 1999. A pre-scoping postcard was mailed on May 18, 1999 to 905 parties soliciting participation in the scoping process. A scoping letter describing the proposal with maps was mailed to people who responded to the postcard and a list of entities we coordinate with on August 2, 1999. A complete list is provided in Appendix C of the FEIS.

Three issues were identified that define the scope of the document and development of the Alternatives. They are as follows:

> ***Issue #1***: Noxious weeds displace native plants and wildlife resulting in loss of biodiversity and habitat function. Aggressive weeds displace desirable native plants, leading to changes away from desired conditions for vegetation according to Beaverhead and Deerlodge Forest Plans. Alternative 1 addresses this issue by using all appropriate methods of weed control, including aerial application of chemical herbicides. Impacts are measured by changes in plant community composition and structure, loss of native vegetation or plant populations, and change in habitat function.
>
> ***Issue #2***: Herbicide risk to humans, animals and plants. Although herbicides proposed for weed control have gone through rigorous scientific testing and government approval, some people perceive the use of these herbicides is unsafe. Alternative 2 addresses this issue by limiting direct weed control to only three methods: biological, cultural, and mechanical. Impacts are measured by potential for herbicides to have an impact on non-target plants, fish, animals, water quality, and people.

Issue #3: Aerial spraying presents unknown risks. Some people are concerned the impacts of chemical herbicides would increase with aerial application. Aerial application is not authorized for existing weed control plans, but ground application has been for at least 12 years and the impacts are well known. Alternative 3 addresses this issue by providing the same level of control under the existing 1987 Beaverhead National Forest Noxious Weed and Poisonous Plant Control Record Of Decision, and 1989 Deerlodge National Forest Noxious Weed Control Decision. Impacts will be measured by changes in plant community composition and structure, loss of native vegetation or plant populations, and change in habitat function.

The fire season of 2000 delayed this project until spring of 2001. Comments from 24 letters in response to the scoping letter were analyzed in May of 2001, which helped shape the alternatives described in the Draft EIS. The DEIS was published with a request for comments on August 13, 2001 and an invitation to comment was published in a legal notice in the Montana Standard on August 24, 2001.

No additional alternatives were presented throughout the public involvement process. However, 13 people sent responses, (available in the project file) and four letters contained substantive comments. The Interdisciplinary Team Leader met with or called those individuals to further discuss and clarify the concerns expressed in the letters. (See DEIS Content Analysis section of Project File). All comments were analyzed and incorporated in the Final EIS. A summary table with responses is provided in Appendix E of the FEIS.

Supportive comments included concerns that the amount of acres treated would be restricted and encouraged use of new herbicides registered by the EPA. Many urged aggressive treatment of weeds.

Comments in opposition to the proposal supported weed control but expressed concern about chemical toxicity, adequate buffers for herbicide use near open water, potential for leaching, and control of vectors of weed spread. Changes in the FEIS effects analysis reflect those concerns about toxicity and leaching to streams and ground water. The revised analysis resulted in additional mitigation in Chapter 2 to protect fish from harmful effects. Chapter 2 also incorporates the OHV amendment signed after the release of the Draft and incorporates the Best Management Practices for prevention of weed spread by forest management activities. Appendix E provides the responses to summarized comments.

Some comments regarding adequacy of testing and registration of herbicides and weed spread from off highway vehicle use are Forest Plan level or other agency decisions, and were not addressed in the FEIS. All comments are contained in the summary table with appropriate responses in Appendix E. None of the comments argued with the need for weed control. Alternative 1 addresses chemical related concerns and contains mitigation for negative effects.

Alternatives Considered

I feel the three alternatives developed and analyzed in this EIS provided an adequate analysis. As described in chapter one, Decision to be Made, the choice is not whether to

treat weeds, but how. As described in chapter one, this EIS takes advantage of the opportunity to combine weed plans adopted before the forests were combined. An EIS is required by Forest Service policy to analyze the effects of aerial application of herbicides. Aerial application is proposed on small sites across the forest that amount to about 9000 acres when combined.

The preferred alternative, (Alternative 1, page 2-2), proposes aerial application of herbicides for a total of 16,018 acres in addition to existing control and prevention practices. It authorizes the use of new herbicides tested and registered by the EPA and treatment of new weed species within the parameters of this EIS. See Table 2.6.4 on page 2-12.

A second alternative (Alternative 2, page 2-2-5) was considered to provide a comparison between weed control with and without use of use of herbicides. This alternative addresses concerns about chemical contamination of public lands. The estimated number of acres treated is based on the assumption that appropriations would not increase under any alternatives. See page 2-5 for the Economic Comparison.

The third alternative considered was the No-Action Alternative, (Alternative 3, page 2-5), which represents the existing program. This alternative employs mechanical, biological, ground applied herbicide with established prevention and education projects. Herbicide use is limited to those authorized before 1990. See Table 2.6.3 on page 2-12.

Environmentally Preferred Alternative: Because it best protects native species and habitat diversity with mitigation adequate to protect resources, Alternative 1 is the environmentally preferred alternative.

Table 2.8.1 Summary of trade-offs and potential impacts between alternatives by issues and objectives

Issue or Objective	***Potential Impacts***		
	Alternative 1	***Alternative 2***	***Alternative 3***
Impacts of weeds • Change in plant community composition and structure. • Loss of sensitive plant populations. • Human health (described in Ch.3) • Change in water quality or beneficial use • Change in soil quality or productivity	Provides highest level of protection for native plant community from weed invasion. Reduces weed-caused impacts to soil and water.	Provides lowest level of protection for native plant community from weed invasion. No reduction of weed-caused impacts to soil and water.	Provides about half the level of protection provided by Alternative 1 for native plant communities from weed invasion, and reduces weed-caused impacts to soil and water.
Impacts of using chemical herbicides • To human health • To fish and animals • To non-target plants • To water quality or beneficial use	No anticipated, adverse impacts from properly used herbicides as required by Label specifications or Forest Service Policy.	N/A – no chemical herbicides used.	No anticipated, adverse impacts from properly used herbicides as required by Label specifications or Forest Service Policy.
Additional risks of Aerial Spraying • To human health • To fish and animals	Mitigation provides for no additional, measurable impacts to humans, fish or animals. There is potential for adverse impacts to non-	N/A – no aerial herbicide application.	N/A – no aerial herbicide application.

Issue or Objective	*Potential Impacts*		
	Alternative 1	*Alternative 2*	*Alternative 3*
• To non-target plants	target plants during aerial applications The annual impact will affect less than 0.002% of the Forest annually. Mitigation will protect sensitive plants.		
Effectiveness of control actions • Inhibit spread • Reduce or eliminate existing infestations	 High High	 Very Low Very Low	 Medium High on accessible sites
Constraint to users of National Forest	Temporary access restrictions to sites during treatment	No additional constraints to Forest use required	Temporary access restrictions to sites during treatment.
Meets Soil Quality Standards	Yes	Yes	Yes
Meets Water Quality Standards	Yes	Yes	Yes

Alternatives Considered and Dismissed

As a result of comments on the Draft EIS, (Project File, IDT Notes 1/16/02) the possibility of a fourth alternative that used more ground and less aerial application was discussed. This alternative was not developed because the difference in acres between the existing program and proposed action, per year, is less than half a percent of total forest acres and is spread across 3.3 million acres. Increasing herbicide application by ground methods doesn't meet the purpose and need in remote, inaccessible sites. This element increases the cost in remote areas in travel time and increased labor for backpack spraying (See Economic Analysis on page 2-6), to cover the same acres described for aerial spray.

Findings Required by Other Laws

Numerous laws, regulations and agency directives require that my decision be consistent with their provisions. To the best of my knowledge, my decision is consistent with all laws, regulations and agency policy relevant to this project. The following discussion is not an all-inclusive listing, but is intended to provide information on the areas raised as issues or comments by the public or other agencies.

National Environmental Policy Act (NEPA)

The purposes of NEPA are to "encourage productive and enjoyable harmony between man and his environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man." I believe Alternative 1 meets the purposes of the Act because of the reasons already stated and as disclosed below.

National Forest Noxious Weed Management Policy (FSM 2080-2083)

Alternative 1 is consistent with the National Forest Noxious Weed Management Policy, which requires District Rangers to prevent the introduction and establishment, and

provide for the containment and suppression, of noxious weeds; and to cooperate with State agencies. The policy is consistent with the Federal Noxious Weed Act of 1974, as amended (7 USC 2801 et seq.)

Endangered Species Act (ESA)
The Beaverhead-Deerlodge National Forest Wildlife Biologist, Fisheries Biologist, and Botany Coordinator evaluated Alternative 1 with regard to threatened and endangered animal and plant species. Findings are summarized in Chapter 4 of the FEIS and in the Biological Assessments and Biological Evaluations (FEIS Appendix M). Concurrence of the not likely to adversely affect the endangered gray wolf (*Canis lupus*), the threatened grizzly bear (*Ursus arctos horribilis*), the threatened bald eagle (*Haliaeetus leucocephalus*) or the threatened Canada lynx (*Lynx canadensis*), and not likely to jeopardize the continued existence of the nonessential experimental gray wolves and will have no effect on the proposed mountain plover (*Charadrius montanus*) determination was received from the Fish & Wildlife Service on April 17, 2002.

Sensitive Species
Federal law and direction applicable to sensitive species include the National Forest Management Act and the Forest Service Manual (2670). The Regional Forester has approved the sensitive species list – those plants and animals for which population viability is a concern (Chapter 3 and Appendix M). In making my decision, I have reviewed analysis and projected effects on all sensitive species listed as occurring or possibly occurring on the Beaverhead-Deerlodge National Forest (FEIS, Appendix M). These findings support the conclusion that Alternative 1 will have no adverse impacts on sensitive species.

Clean Water Act
Based on the measures outlined in the FEIS to protect soil and water resources (FEIS 2-11) and the Soil and Aquatics Analysis in Chapter 4, I believe Alternative 1 meets the intent of the Clean Water Act. In response to public concern buffers for aerial application around open water were increased to 300 feet near all open water. See page 2-14.4.

Montana Clean Water Act: Regulatory Framework:
Section 313 of the Montana Clean Water Act (CWA) requires Federal Agencies to comply with all substantive and procedural requirements related to water quality. This decision complies with those requirements as addressed in the FEIS, Section 4.4 Fisheries and Water Quality on page 4-11.

The National Forest Management Act of 1976 (PL-94-588). The National Forest Management Act and accompanying regulations require that several other specific findings be documented.

Forest Plan Consistency – Management activities are to be consistent with the Forest Plan [p16 USC 1604 (i)]. The Forest Plan guides management activities [26 CFR 219.1 (b)]. Consistency with the Forest Plan is discussed in Chapter 4 as appropriate by resource.

Resource Protection – the following 12 statements address resource protection requirements of NFMA:

1. Alternative 1 conserves soil and water resources and does not allow significant or permanent impairment of the productivity of the land (FEIS 4-11 through 4-20).
2. Within the scope of the project and consistent with the other resource values involved, activities will minimize risks from serious or long-lasting hazards. (FEIS 2-11 to14)
3. The purpose of this project is to prevent or reduce serious, long lasting hazards, and damage from pest organisms, utilizing principles of integrated pest management (FEIS 1-1 and 2).
4. Alternative 1 will protect bodies of water (FEIS, 2-12)
5. Alternative 1 will provide for and maintain a diversity of plant and animal communities by reducing displacement of native plant species (FEIS 1-2 and 1-3), and by aggressively treating invader species.
6. Alternative 1 will maintain sufficient habitat for viable populations of existing native vertebrate species (FEIS 4-19 to 22).
7. The FEIS assesses potential physical, biological, aesthetic, cultural, engineering, and economic impacts of Alternative 1 and is consistent with multiple uses planned for the Forest.
8. Alternative 1 prevents the destruction or adverse modification of critical habitat for threatened and endangered species (Biological Assessments and Letters of Concurrence 4/17/02, and 5/22/02, in Project File)
9. There are no right-of-way corridors needed to accommodate the project.
10. There is no road construction associated with this project.
11. No temporary roads will be built.
12. Applicable Federal, State, and local air quality standards will be met.

Riparian Areas, Soil and Water – All riparian areas, soil and water will be protected as described in the FEIS (page 2-19 and Figure 2.3.1 on page 2-4)

Diversity – The purpose of this project is to preserve and enhance the diversity of plant and animal communities by reducing and limiting the spread of noxious weeds. (FEIS 1-2) Alternative 1 is consistent with this objective.

The Federal Land Policy Management Act of 1976 (PL 94-579)
This Act authorizes control of weeds on rangeland.

Environmental Justice and Civil Rights
Executive Order 12898, issued in 1994 ordered Federal Agencies to identify and address any adverse human health and environmental effects of agency programs that disproportionately impact minority and low-income populations. At this time, no minority or low-income communities have been identified in southwest Montana. This project does not disproportionately impact any human populations.
The Civil Rights Act of 1964 provides for nondiscrimination in voting, public accommodations, public facilities, public education, federally assisted programs, and

equal employment opportunity. Title VI of the Act, Nondiscrimination in Federally Assisted Programs, as amended (42 U.S. C. 2000d through 2000d-6) prohibits discrimination based on race, color, or national origin.

While the alternatives may have differing effects on wildlife and fish, as described in Chapter 3, none of the alternatives would alter opportunities for subsistence hunting and fishing by Native American tribes. Tribes holding treaty rights for hunting and fishing on the Beaverhead-Deerlodge National Forest are included on the project mailing list, and had the opportunity to provide comments on this project.

The National Historic Preservation Act of 1966
Alternative 1 would result in the lowest loss of biotic heritage resources. Aerial spraying poses no impact to archeological or historic sites and mechanical treatment (mostly hand pulling of weeds) is limited to 35 acres. Of the known historic sites on the BDNF, none are located in areas of weed infestation proposed for that type of treatment. Mechanical treatment would have no effect on the qualities that make the sites eligible for the National Register of Historic Places

Executive Order 13112, Invasive Species, February 3, 1999.
Alternative 1 complies with this order directing Federal Agencies whose actions may affect the status of invasive species to (i) prevent the introduction of invasive species, (ii) detect and respond rapidly to, and control, populations of such species in a cost-effective and environmentally sound manner, as appropriations allow.

36 CFR Sub A, Sec 222.8.
All alternatives comply with this direction: " . . . The Chief, of the Forest Service, will cooperate with County or other local weed control Districts in analyzing noxious farm weed problems and developing control programs in areas which the National Forests and National Grasslands are a part."

Federal Noxious Weed Act of 1974 (sec 9)
Alternative 1 complies with this authorization for the Secretary to cooperate with other Federal and State Agencies or political subdivisions thereof, and individuals in carrying out measures to eradicate, suppress, control or prevent the spread of noxious weeds.

Public Law 90-583 (Carlson-Foley Act, October 17, 1968).
Cooperative agreements described in the FEIS (page 1-3) are in compliance with this law that authorizes and directs heads of Federal Departments and Agencies to permit control of noxious plants by State and local governments on a re-imbursement basis in connection with similar and acceptable weed control programs being carried out on adjacent non-Federal land.

The State of Montana County Noxious Weed Management Act
This Act provides for designation of noxious weeds within the State, and directs control efforts. Provisions are made for registration of pesticides, licensing of distributors and applicators, and enforcement of State statutes. An enforcement responsibility for the control of noxious weeds within Montana is delegated to County Commissioners through weed management District weed boards.

Mitigation

Concerns about use of herbicides and impacts to humans and other components of our ecosystem are shared. While we have analyzed and disclosed those effects I recognize there will always be data gaps and some degree of uncertainty with any course of action selected. I do not take this responsibility lightly. The planning team included, and even increased some mitigation measures, such as a 300-foot buffer from all open water and requiring a field inspector on site to monitor drift and label compliance, (page 2-11), to ensure the highest possible level of protection balanced with the need to treat noxious weeds.

Management requirements call for the mitigation described in Chapter 2 of the FEIS and application of herbicides according to label specifications. These requirements will result in no significant effect on the public or resources from the use of herbicides, including aerial application. The potential for damage caused by invasive weeds is more certain than the risks posed by herbicides or aerial application. I feel the risk to people plants and animals is minimal when the protection of biodiversity and habitat on the BDNF and neighboring land is at stake.

Alternative 1, for the reasons stated above, best meets the Goals and Standards in the Beaverhead and Deerlodge National Forest Plans. It also meets the Purpose and Need described in the EIS and the issues brought up by the public and planning team over the course of this analysis.

Monitoring and Evaluation

Monitoring provides the basis for future treatment of additional sites as new infestations are discovered. Figure 2-1 on page 2-4, provides a flow chart to show the decision process to determine treatment. Infestations known to occur in project areas but not previously quantified will also be inventoried, and site-specific recommendations for treatment will be made. Priorities for treatment will be based on weed species present, infestation size and vulnerability of recreational, wildlife, aquatic and special vegetation resources.

Treatment methods for each site will be determined based on weed species ecology, cost-effectiveness of treatment and management objectives for the site, (eradication or reduction of seed production). Proposed treatments will be evaluated to determine if they fit within the scope of the FEIS relative to the issues analyzed. When monitoring reports indicate acres treated annually exceed 16,019, any additional treatment acres will be reviewed under the National Environmental Policy Act. Since 1997 we have treated between 5,000 and 7,000 acres per year according to the Chemical Use Report in the Project File under Vegetation.

Monitoring of treatment sites will be conducted annually. Assessment of the effectiveness of control efforts will consider the weed management objective for each site as well as the infestation size and percent occupancy of the target weed species following treatment.

Monitoring will evaluate how well objectives of the FEIS are being met and to determine the effects of project implementation on the environment. Depending on the stage of the project, monitoring will vary in intensity by resource element being monitored. All

monitoring programs are designed to assure impacts to resources are minimal and to allow corrective actions to be taken immediately should unanticipated actions occur.

The adequacy of the findings and resource data in the FEIS will be monitored over time to insure weed treatment in the future will be in conformance with the latest laws, regulations and resource management requirements. The monitoring results will be evaluated over time to determine: 1) Whether existing weed treatment should continue, be modified or discontinued, and 2) Whether additional monitoring is needed

Principal Factors Considered in My Decision

Forest Plan and Agency objectives for biodiversity responsibility to health and human safety, responsibility to neighboring lands, and consistency with Federal and State laws dictate an aggressive and effective weed control program. Weed infestations can cause substantial habitat loss as well as negatively affect diversity of plant communities and habitat function.

There is strong public support for taking action on our invasive weed problem. Weeds will not go away by themselves. The formal and informal comments of support in the past indicate the people who live near and recreate on the Forest expect me to take aggressive action to control weeds. I feel any course of action other than Alternative 1 would not be responsive to the public and would not fulfill my responsibility as steward of the Beaverhead-Deerlodge National Forest.

While the concern over noxious weeds increases, funding doesn't. The tables presented in Chapter 2, (Table 2.4.2 and 3) show how efficient aerial spraying is compared to mechanical and ground application of herbicides. As stated in the EIS, biological control is a long-term process with only recent history on the BDNF. Herbicide use supports biologic control, which is a slower process. Weed spread is fast and aerial application allows us to attack weeds that are creeping into remote areas of the forest.

Consistency with Forest Plan goals, objectives and standards.

Existing Forest Plans for both the Beaverhead and Deerlodge National Forests direct control of noxious weeds as priority items (Page II-9, BNFP; Page II-3, DNFP): This decision fully complies with direction in both forest plans.

Compatibility with law, policy, other agency, and Tribal goals.

Coordination with the BLM, State, Tribal and Beaverhead, Madison, Granite and Powell county weed boards, Montana Weed Control Association, Headwaters RC&D range weed committee and others has been in place for years. The project contains examples of current cooperative agreements. This decision will allow the BDNF to better support existing weed control by surrounding land managers and owners and fully meet obligations under laws listed in the FIES page 1.5.

Consistency with Forest Service Natural Resource Agenda

The USDA Forest Service Natural Resource Agenda identifies four main areas of concern. These include Healthy Watersheds, Forest Roads, Sustainable Forest Ecosystem Management and America's Playground. The Selected Action is consistent with all four objectives of the Natural Resource Agenda. The Selected Action maintains healthy watersheds by reducing sediment. The Selected Action does not build any new roads or

call for any additional maintenance. Public access is not affected. The Selected Action promotes sustainable forest ecosystem management by increasing potential for biodiversity and enhancing the historic vegetative condition of riparian and upland areas.

Consistency with Northern Region Overview Detailed Report, 1998

The Northern Region Overview indicates that Aspen, Ponderosa pine, Whitebark pine, Dry Douglas fir, Lodgepole pine (moderate), Upland grass/shrubs, Sagebrush/grass, and Riparian vegetation are most at risk due to a number of variables, including noxious weeds such as, Dalmatian toadflax, leafy spurge, spotted knapweed, sulfur cinquefoil. This decision fully addresses the concerns identified in the Northern Region Overview.

Implementation and Appeal Procedures

This decision is subject to appeal pursuant to 36 CFR 215.7. A written Notice of Appeal must be submitted within 45 days after the date the notice of this decision is published in the Montana Standard, Butte, Montana. Appeals must be submitted to:

USDA Forest Service, Northern Region
ATTN: Appeals Deciding Officer (RFO)
P.O. Box 7669
Missoula, MT 59807

Appeals must meet the content requirements of 36 CFR 215.14. At a minimum, in compliance with section 215.14, your Notice of Appeal must include

- A statement that your document is an appeal filed according to 36 CFR part 215.
- Your name, address and if possible, telephone number;
- The decision being appealed by title and subject,
- Decision date and Responsible official, Gary A. Morrison, Acting Forest Supervisor.

Identify the specific change(s) in the decision you seek or portion of the decision to which you object; and state how the Responsible Official's decision fails to consider comments previously provided, either before or during the 45-day comment period. Your appeal will be dismissed if the preceding information is not included in the Notice of Appeal.

The FEIS and supporting documentation are available for public review at the Beaverhead-Deerlodge National Forest Supervisors Office, 420 Barrett, Dillon, Montana. You may also contact Leaf Magnuson, Interdisciplinary Team Leader, Beaverhead-Deerlodge National Forest, 420 Barrett, Dillon, MT, 59725, phone (406) 683-3950.

If no appeal is received, implementation of this decision may occur on, but not before, five business days from the close of the 45 day appeal filing period. If an appeal is received, implementation may not occur for 15 days following the date of appeal disposition.

Gary A. Morrison   Date 5-28-02

Gary A. Morrison, Acting Forest Supervisor
Beaverhead-Deerlodge National Forest

Beaverhead-Deerlodge National Forest Noxious Weed Control Program
Final Environmental Impact Statement

Beaverhead-Deerlodge National Forest
Supervisor's Office
Dillon, Montana
May 2002

Deciding Official: Gary A Morrison, Acting Forest Supervisor

For further information contact:
Leaf Magnuson, Project Team Leader
Beaverhead-Deerlodge National Forest
420 Barrett
Dillon, Montana 59725
(406) 683-3950

ABSTRACT

The Forest Service is proposing an integrated weed management program to update and integrate the 1986 and 1989 weed control decisions currently in effect. The proposal seeks to evaluate a reasonable course of action given new problems, options and opportunities to combat weeds. Existing decisions do not provide the forest with the ability to effectively treat increasing weed infestations. The decision to be made involves these questions:

- What level of weed control to implement on the Beaverhead-Deerlodge National Forest (BDNF)
- Where and what kind of weed controls will be used.
- What measures will be required to appropriately implement weed control methods.
- Whether aerial application of chemical herbicides can be implemented.

Three alternative courses of action have been developed to achieve these objectives. Alternative 1 includes all methods used for existing weed control but includes aerial application of herbicides. Alternative 2 combines mechanical and biological methods to control weeds without herbicides. Alternative 3 takes no action to change the current weed management situation, which includes ground based herbicide treatment. The selected alternative is Alternative 1.

Summary

Introduction

Forest Plan and Agency objectives for biodiversity responsibility to health and human safety, responsibility to neighboring lands, and consistency with Federal and State laws dictate an aggressive and effective weed control program. Weed infestations can cause substantial habitat loss as well as negatively affect diversity of plant communities and habitat function.

There is strong public support for taking action on our invasive weed problem. Weeds will not go away by themselves. The formal and informal comments of support in the past indicate the people who live near and recreate on the Forest expect aggressive action to control weeds.

The EIS addresses concerns about noxious weeds increases, and impacts of herbicides. The tables presented in Chapter 2, (Table 2.4.2 and 3) show the efficiency of aerial spraying compared to mechanical and ground application of herbicides. Mitigation addresses concerns about impacts on people, aquatics, vegetation and wildlife. Because the concerns are largely about herbicides most of the documentation focuses on that aspect. Other avenues of treatment are included. As stated in the EIS, biological control is a long-term process with a short history on the Forest as described on page 2-7. Herbicide use supports biologic control, which is a slow process. Weed spread is fast. The proposal includes aerial application, which allows us to attack weeds creeping into remote areas of the forest. Prevention and education are an established piece of existing treatment program and are not dealt with in detail in the EIS but they are recognized as a critical element.

This Environmental Impact Statement (EIS) discloses the environmental impacts of annual treatments of 16,019 acres of noxious weeds on the Beaverhead-Deerlodge National Forest (BDNF). Throughout the document references to weeds include noxious, exotic or invasive non-native species found on the State and Federal noxious weed lists in Chapter 2, Table 2.6.1.

The proposal integrates herbicide treatment of 9,028 acres by air, 6,831 acres by ground application, 35 acres by mechanical treatment (hand pulling), and 125 acres by biological control over the next 10 years. Acres identified in this document are proposed for annual treatment. Total infested acres are about 43,000 acres or 1.3% of 3.3 million acres the BDNF. Maps in Appendix B display proposed treatment areas by Ranger District.

Purpose and Need for Action

Both the Beaverhead and Deerlodge National Forest Plans direct control of noxious weeds as priority items (Page II-9, BNFP; Page II-3, DNFP). The Beaverhead National Forest established an aggressive noxious weed control program to be continued and expanded to reduce or eliminate weeds (II-37).

Noxious weeds are increasing and expanding their range. This knowledge is uncontested. We expect the pattern of expansion to continue through transportation of seeds from increasing commercial and recreational travel across the BDNF and through continued disturbance on all lands (agricultural, residential, recreational and commercial developments). The spread of weeds from non-Forest lands inside and adjacent to Forest land will also contribute to increased weed infestation. The number of invader species and their distribution will increase if we do not treat weeds.

Although less than one percent of the BDNF is now infested with weeds, past experience shows weeds become epidemic when an aggressive weed control program is delayed. The Lolo, Bitterroot, Flathead,

Kootenai National Forests, for example, comprise 87% of infested acres in Montana, North Dakota and parts of South Dakota. Weed infestations affect 16% of the Bitterroot National Forest lands. The BDNF shares boundaries with the Bitterroot and Lolo National Forests on the north and west sides, which increases the urgency for adopting an aggressive weed control program.

The Beaverhead National Forest in 1987 and the Deerlodge National Forest in 1989, implemented weed control programs to manage weed infestations. However, weed infestations in inaccessible areas have increased over the last decade because they were left untreated. Infestations in accessible areas on the Forest are mostly contained or suppressed. This proposal would allow Forest weed coordinators the option to use the most appropriate and effective tools to suppress or control weeds when appropriate, in order to protect biodiversity and enhance native vegetation on the BDNF.

Weeds in steep and remote terrain on the Forest, such as the divide between the Bitterroot and Big Hole Valleys, are currently left untreated because aerial spraying is not authorized under existing weed control plans. Sensitive alpine soils limit mechanical treatment in some areas and the cost of labor for hand pulling is prohibitive. (See Economic Analysis on page 2-6).

The nationwide emphasis on noxious weeds has resulted in the development of better, more effective chemicals. Alternative one provides the flexibility to use new herbicides and biologic controls tested and registered by the Environmental Protection Agency. It also provides districts with the ability to treat new sites and new invaders in a timely fashion under this Decision.

I select Alternative 1 as presented in the Beaverhead-Deerlodge National Forest Noxious Weed Final Environmental Impact Statement (FEIS) on page 2-2. With this decision I authorize the implementation of an integrated weed management strategy for the Forest, which includes aerial application of herbicides. Additional changes incorporate the use of new herbicides registered by the Environmental Protection Agency and treatment of new weeds not considered in previous analyses.

Key Issues

Extensive public involvement (Appendix D) resulted in the identification of three issues, which define the scope of the document and development of the Alternatives. They are:

> ***Issue #1***: Noxious weeds displace native plants and wildlife resulting in loss of biodiversity and habitat function. Aggressive weeds displace desirable native plants, leading to changes away from desired conditions for vegetation according to Beaverhead and Deerlodge Forest Plans. Alternative 1 addresses this issue by using all appropriate methods of weed control, including aerial application of chemical herbicides. Impacts are measured by changes in plant community composition and structure, loss of native vegetation or plant populations, and change in habitat function.
>
> ***Issue #2***: Herbicide risk to humans, animals and plants. Although herbicides proposed for weed control have gone through rigorous scientific testing and government approval, some people perceive the use of these herbicides is unsafe. Alternative 2 addresses this issue by limiting direct weed control to only three methods: biological, cultural, and mechanical. Impacts are measured by potential for herbicides to have an impact on non-target plants, fish, animals, water quality, and people.

> ***Issue #3***: Aerial spraying presents unknown risks. Some people are concerned the impacts of chemical herbicides would increase with aerial application. Aerial application is not authorized in existing weed control plans, but ground application has been for 12 years and the impacts are well known. Alternative 3 addresses this issue by providing the same level of control under the existing 1987 Beaverhead National Forest Noxious Weed and Poisonous Plant Control Record Of Decision, and 1989 Deerlodge National Forest Noxious Weed Control Decision. Impacts will be measured by changes in plant community composition and structure, loss of native vegetation or plant populations, and change in habitat function.

No additional alternatives were presented throughout the public involvement process. However, 13 people sent responses, (available in the project file) four of which contained substantive comments. The Interdisciplinary Team Leader met with or called those individuals to further discuss and clarify the concerns expressed in the letters. (See DEIS Content Analysis section of Project File). All comments were analyzed and incorporated in the Final EIS. A summary table with responses is provided in Appendix E of the FEIS.

Supportive comments included concerns that the amount of acres treated would be restricted. Many encouraged use of new herbicides registered by the EPA and urged aggressive treatment of weeds.

Comments in opposition to the proposal supported weed control but expressed concern about chemical toxicity, adequate buffers for herbicide use near open water, potential for leaching, and control of vectors of weed spread. Changes in the FEIS effects analysis reflect those concerns about toxicity and leaching to streams and ground water. The revised analysis resulted in additional mitigation in Chapter 2 to protect fish from harmful effects. Chapter 2 also incorporates the OHV amendment signed after the release of the Draft and incorporates the Best Management Practices for prevention of weed spread by forest management activities. Appendix E provides the responses to summarized comments.

Some comments regarding adequacy of testing and registration of herbicides and weed spread from off highway vehicle use are Forest Plan level or other agency decisions, and were not addressed in the FEIS. All comments are contained in the summary table with appropriate responses in Appendix E. None of the comments argued with the need for weed control. Alternative 1 addresses chemical related concerns and contains mitigation for negative effects.

Alternatives Considered

Three alternatives were developed and analyzed in this EIS. As described in chapter one, the decision is not *whether* to treat weeds, but *how*. This EIS takes advantage of the opportunity to consolidate weed plans adopted before the forests were combined. An EIS is required by Forest Service policy to analyze the effects of aerial application of herbicides. Aerial application is proposed on small sites across the forest that amount to about 9000 acres when combined.

The preferred alternative, (Alternative 1, page 2-2), proposes aerial application of herbicides for a total of 16,018 acres in addition to existing control and prevention practices. It authorizes the use of new herbicides tested and registered by the EPA and treatment of new weed species within the parameters of this EIS. See Table 2.6.4 on page 2-12.

A second alternative (Alternative 2, page 2-2-5) was considered to provide a comparison between weed control with and without use of use of herbicides. This alternative addresses concerns about

chemical contamination of public lands. The estimated number of acres treated is based on the assumption that appropriations would not increase under any alternatives. See page 2-5 for the Economic Comparison.

The third alternative considered was the No-Action Alternative, (Alternative 3, page 2-5), which represents the existing program. This alternative employs mechanical, biological, ground applied herbicide with established prevention and education projects. Herbicide use is limited to those authorized before 1990. See Table 2.6.3 on page 2-12.

Environmentally Preferred Alternative: Because it best protects native species and habitat diversity with mitigation adequate to protect resources, Alternative 1 is the environmentally preferred alternative.

Table 2.8.1 Summary of trade-offs and potential impacts between alternatives by issues and objectives

Issue or Objective	*Potential Impacts*		
	Alternative 1	*Alternative 2*	*Alternative 3*
Impacts of weeds • Change in plant community composition and structure. • Loss of sensitive plant populations. • Human health (described in Ch.3) • Change in water quality or beneficial use • Change in soil quality or productivity	Provides highest level of protection for native plant community from weed invasion. Reduces weed-caused impacts to soil and water.	Provides lowest level of protection for native plant community from weed invasion. No reduction of weed-caused impacts to soil and water.	Provides about half the level of protection provided by Alternative 1 for native plant communities from weed invasion, and reduces weed-caused impacts to soil and water.
Impacts of using chemical herbicides • To human health • To fish and animals • To non-target plants • To water quality or beneficial use	No anticipated, adverse impacts from properly used herbicides as required by Label specifications or Forest Service Policy.	N/A – no chemical herbicides used.	No anticipated, adverse impacts from properly used herbicides as required by Label specifications or Forest Service Policy.
Additional risks of Aerial Spraying • To human health • To fish and animals • To non-target plants	Mitigation provides for no additional, measurable impacts to humans, fish or animals. There is potential for adverse impacts to non-target plants during aerial applications The annual impact will affect less than 0.002% of the Forest annually. Mitigation will protect sensitive plants.	N/A – no aerial herbicide application.	N/A – no aerial herbicide application.
Effectiveness of control actions • Inhibit spread • Reduce or eliminate existing infestations	High High	Very Low Very Low	Medium High on accessible sites
Constraint to users of National Forest	Temporary access restricted to sites during treatment	No additional constraints to Forest use required	Temporary access restrictions to sites during treatment.
Meets Soil Quality Standards	Yes	Yes	Yes
Meets Water Quality Standards	Yes	Yes	Yes

Alternatives Considered and Dismissed

As a result of comments on the Draft EIS, (Project File, IDT Notes 1/16/02) a request for a fourth alternative that used more ground and less aerial application was discussed. This alternative was not developed because the difference in acres between the existing program and proposed action, per year, is less than half a percent of total forest acres and is spread across 3.3 million acres. Increasing

herbicide application by ground methods doesn't meet the purpose and need in remote, inaccessible sites. This element increases the cost in remote areas in travel time and increased labor for backpack spraying (See Economic Analysis on page 2-6), to cover the same acres described for aerial spray.

Mitigation

Concerns about use of herbicides and impacts to humans and other components of our ecosystem, especially aquatic species, are shared. Mitigation for herbicide use (page 2-14) involves restrictions and special measures to protect open water, riparian zones and incorporates Best Management Practices for herbicide use and type of chemicals used to prevent negative impacts. The Biological Analysis and Evaluation for Aquatics, (Appendix M,) address these concerns in great detail.

Monitoring and Evaluation

Monitoring of treatment sites will be conducted annually. Assessment of the effectiveness of control efforts will consider the weed management objective for each site as well as the infestation size and percent occupancy of the target weed species following treatment. Monitoring will evaluate how well objectives of the FEIS are being met and to determine the effects of project implementation on the environment. Depending on the stage of the project, monitoring will vary in intensity by resource element being monitored. All monitoring programs are designed to assure impacts to resources are minimal and to allow corrective actions to be taken immediately should unanticipated actions occur.

The adequacy of the findings and resource data in the FEIS will be monitored over time to insure future weed treatment conforms to laws, regulations and resource management requirements in effect at that time. Monitoring results will evaluate: 1) Whether existing weed treatment should continue, be modified or discontinued, and 2) Whether additional monitoring is needed

Treatment methods for each site will be determined based on weed species ecology, cost-effectiveness of treatment and management objectives for the site, (eradication or reduction of seed production). Proposed treatments will be evaluated to determine if they fit within the scope of the FEIS relative to the issues analyzed. When monitoring reports indicate acres treated annually exceed 16,019, any additional treatment acres will be reviewed under the National Environmental Policy Act.

Changes from Draft to Final EIS

Substantial changes are indicated where analysis has been increased, corrected or rewritten for clarity in response to comments on the Draft. Technical changes, such as comma, misspellings, and minor clarifications have been incorporated but not listed. Tables throughout the Document have been renumbered to reduce confusion and are listed in the Table of Contents.

Chapter 1

- In the space of time between the Draft EIS and the Final the Bureau of Land Management gave administrative responsibility for 150 acre horse pasture to the Philipsburg Ranger District. That increased the total acres proposed for aerial application by 150 acres, which is reflected throughout the document.
- Introduction reworded to include acres by treatment method. Same information repeated in proposed action on page 1-3.
- Purpose and need section reworded for clarity, page 1-1..
- The Proposed Action description beginning on page 1-3, incorporates an expanded list (Appendix L) of cooperative programs and the OHV Amendment (signed into effect after the release of the Draft EIS) as important components of the proposal.
- Addition of the Risk Assessment for Herbicide Use in Forest Service Regions 1, 2, 3, 4, and 10 and on Bonneville Power Administration Sites as a reference on page 1-4.
- Description of treatment for new weeds changed under Proposed Action description on the bottom of page 1-4.

Chapter 2

- Mitigation, page 2-13 was increased substantially in response to concerns about aquatic and amphibian species.
- Selection criteria for aerial application was added on page 2-3
- Treatment decision table added on page 2-4.
- Economic Analysis beginning on page 2-6, revised to provide meaningful analysis of cost by alternatives in response to comments received.
- The history of biologic control for weeds on the BDNF is referred to on page 2-6 and the description was added to the list of biologic controls in Appendix I.
- Discussion included about consideration given an alternative between aerial application and existing methods in response to comments, in Section 2.5 on page 2-8.

- Use of new herbicides dropped from No-Action alternative resulting in separate tables of herbicides available for use under Alternatives on page 2-12
- Wind speed restriction of 10 mph changed to 6 mph or less for aerial application of herbicide on page 2-14.
- Description of District Monitoring reports is included on page 2-15.

Chapter 3

Effects by Resource, Where needed, the analysis area for direct, indirect and cumulative effects has been more clearly described.

- Two pages of photos to describe categories of infestations
- Page 2, Management Goals and Objectives includes a brief discussion of weed treatment in Roadless and Wilderness Areas.
- 3-23 reference to location of site specific information on past mgmt
- Included table describing of streams with water quality limited segments on BDNF
- Section 3.5.6 Soils has been reworded to include references to analysis based on data files.

Chapter 4

- Introduction includes existing direction from Beaverhead and Deerlodge Forest Plans.
- Page 4-3 includes more detail about biological controls use on the Forest and the history of the program was added to Appendix I.
- Discussion clarified for effects on WQLS streams on page 4-13.
- Changes in section 4.5.1 and 4.5.2 to Effects for Alternative 1 and 3 in Wildlife section on page 4.22 were changed to include the finding of no impact in the Biological Assessment and concurrence from the USF&WS. Effects to small mammals and insects were included in the context of the Risk Assessment for Herbicide Use in Forest Service Regions 1, 2, 3, 4, and 10 and on Bonneville Power Administration Sites, 2000,
- The Soil Resources section, page 4-30 includes better descriptions of effects evaluation and references.
- Errors in calculations in DEIS for storm runoff events were identified and resulted in additional mitigation required for herbicide application in specific watershed described in Chapter 4 and the Biological Assessment for fisheries. The effects section changed

substantially based on the revised analysis and Biological Assessment.

- The Heritage Section, page 4-33, contains corrections to clarify mechanical treatment impacts under all three alternatives.

Appendix

- List of cooperative projects and partnerships Appendix L
- List of acres proposed for aerial application by Management Area Appendix J
- Biological Assessments and Evaluations for Fisheries and Wildlife were added in Appendix M.
- List of streams where herbicide use is proposed 300 feet from streams has been moved from the Appendix in the Draft and is now an Appendix in the Biologic Assessment for fisheries.

Table of Contents

List of Tables and Figures

CHAPTER 1 – THE PROPOSED ACTION

1.1 INTRODUCTION

This Environmental Impact Statement (EIS) discloses the environmental impacts of annual treatments of 16,019 acres of noxious weeds on the Beaverhead-Deerlodge National Forest (BDNF). The Federal Noxious Weed Act of 1974 defines a noxious weed as "a plant which is of foreign origin, is new to, or is not widely prevalent in the United States, and can directly or indirectly injure crops or other useful plants, livestock or the fish and wildlife resources of the United States, or the public health" (P.L. 93-629). Throughout this document references to weeds include noxious, exotic or invasive non-native species found on the State and Federal noxious weed lists in Chapter 2, Table 2.6.1.

The proposal integrates herbicide treatment of 9,028 acres by air, 6,831 acres by ground application, 35 acres by mechanical treatment (hand pulling), and 125 acres by biological control over the next 10 years. Acres identified in this document are proposed for annual treatment. Total infested acres are about 43,000 acres or 1.3% of 3.3 million acres the BDNF. Maps in Appendix B display proposed treatment areas by District.

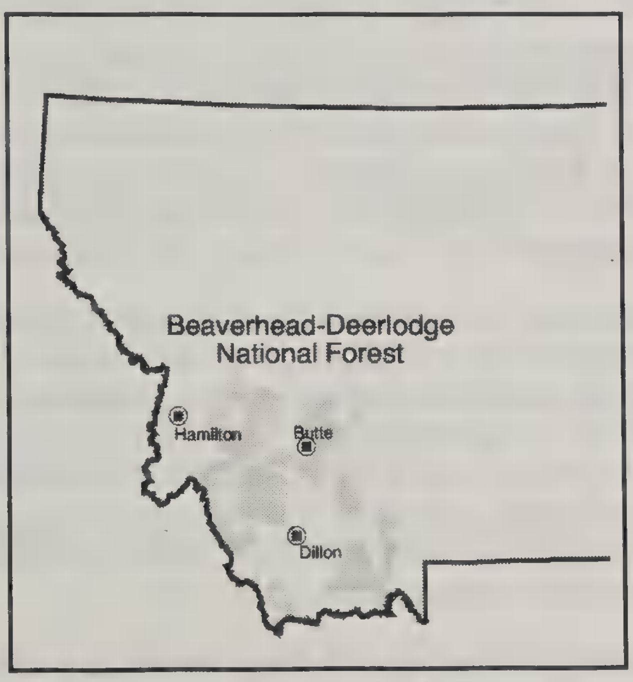


Figure 1.1.1 Project Vicinity Map

Chapter 1 describes the proposed action and the purpose and need for the proposal, the scope and analysis of the proposal, and the decision to be made. A brief explanation of the reasons, situation and consequences of this proposal, and alternatives follows. Descriptions are based upon a detailed project record, available for public review at the Forest Supervisor's Office in Dillon, Montana.

1.2 PURPOSE & NEED FOR ACTION

Since the late 1800's, weed species have spread across the Pacific Northwest. Distribution records indicate weeds are increasing and expanding their range (Rice 1999). From these trends, we expect the pattern of expansion to continue onto the Beaverhead-Deerlodge National Forest. Transport of seeds from increasing recreation and commercial travel and continued disturbance on all lands

(agricultural, residential, recreational and commercial developments) contribute to the spread of weeds. The spread of weeds from non-Forest lands inside and adjacent to Forest land will also contribute to increased weed infestation.

Results of uncontrolled weed spread are well documented. (Sheley, et al, 1998) (Rice, 2001) (U.S. Congress, 1993) (Tu, et al, 2001) Without treatment, weeds increase about 14% a year under natural conditions (USDI 1985, USDI 1991A, USDI 1996). These studies show the number of invader species and their distribution on the Forest will continue to increase if not aggressively treated.

The Lolo, Bitterroot, Flathead and Kootenai national forests, for example, comprise 87% of infested acres in Region One, (Montana, North Dakota and parts of South Dakota). Weed infestations affect 16% of the Bitterroot National Forest lands. On the BDNF at this time, infested lands total less than half a percent. See Table 2.4.2. The BDNF abuts the Bitterroot and Lolo National Forests on the north and west boundaries, both of which have high infestation rates creating urgency for updating and integrating the BDNF Noxious Weed Control Program.

The use of biological, mechanical and herbicide treatment under existing weed plans (Beaverhead National Forest since 1987 and the Deerlodge National Forest since 1989), requires ground transportation. Weeds in steep and remote terrain on the Forest, such as the divide between the Bitterroot and Big Hole Valleys, are left untreated because aerial spraying is not authorized under existing weed control plans. Sensitive alpine soils limit mechanical treatment in some areas and the cost of labor for hand pulling is prohibitive. (See page 2-6). In order to treat inaccessible areas this weed program proposes the use of aerial application and the flexibility to use new registered herbicides and biologic controls as appropriate.

Responsible land management: Forest Plan and Agency objectives for biodiversity, responsibility to health and human safety, responsibility to neighboring lands and consistency with Federal and State laws dictate an aggressive and effective weed control program. Weed infestations can cause substantial habitat loss as well as negatively affect diversity of plant communities and habitat function. Our current inability to treat some infestations leads to a continual and compounding annual loss of desired habitat to weeds and creates the potential to infest adjacent lands or defeat existing control efforts by neighboring landowners This is inconsistent with Forest Plan and Northern Region goals for sustaining native plant diversity and desired community function.

The Northern Region Overview identified weeds as the greatest risk to grass and shrub lands on National Forest. New, safer target-specific herbicides and biological controls are now available that were not considered in previous decisions. These new controls can be more effective while reducing impacts to humans and non-target species. Aerial application in locations identified in Appendix B, and authorization of new herbicides and biocontrols can increase the effectiveness of the BDNF weed control program.

Why Update Existing Decisions:

The Beaverhead and Deerlodge National Forests were combined into one administrative unit in 1996. The respective weed plans remain separate. This EIS provides the opportunity to update and integrate the 1986 and 1989 weed control decisions to encompass both Forests. In addition Forest Service Handbook 1909.15 – Chapter 20 requires an EIS for proposals involving aerial application of herbicides.

There is a need to review our current management strategies and tactics to evaluate a reasonable course of action given new problems, options and opportunities. Existing decisions do not allow us to keep up with weeds introduced at a faster rate than anticipated in previous analyses. The speed of introduction is increasing because:

- Large infestations are appearing on lands adjacent to National Forest as a rapid increase of users from weed-infested areas travel to National Forests.
- New weed species are invading areas not considered in previous decisions.
- Changes in types of use, Off-highway vehicles for example, increase the opportunity for and the rate of infestations.

Controls do not match the rate of infestation in remote inaccessible areas, because weeds go untreated. Under current direction, we plan to treat about 12,000 acres annually. Aerial herbicide application is not authorized under existing weed programs, which limited treatment to about 6,500 acres per year, (50-60% of identified needs). As a result, control efforts only slow the spread of weeds on the Forest rather than contain or eradicate infestations.

In order to update and refine current Forest weed control programs the following developments were considered.

- Seed spread by the increase of all types of recreational and commercial use on the Forest.
- Changes in sites, modes and rates of weed spread and the impact on Forest use
- Introduction of new weed species
- Improved tools such as recently registered herbicides and use of aerial application methods.
- Information from weed control project monitoring.
- More effective prevention requirements and mitigation measures. (Appendix H)

1.3 PROPOSED ACTION

The BDNF proposes to integrate herbicide treatment of 9,028 acres by air, 6,831 acres by ground application, 35 acres by mechanical treatment (hand pulling), and 125 acres by biological control with existing prevention and education for a multi-disciplinary, ecological approach to prevent and manage weeds on the Forest. The combination of preventive strategies and management techniques shapes the composition and structure of the plant community to promote ecosystem health and function. The goal is to develop and maintain healthy, desired plant communities with the ability to resist weed infestations, using the best available methods appropriate for each site.

The proposed action combines aggressive education, prevention and detection programs with biological, mechanical, cultural and herbicide control. Aerial application of herbicide is included in the analysis to add one more tool in areas where other methods are not practical or effective. Four additional components are incorporated in this plan and provide strong prevention and education support for this weed control program. They are:

1. Coordination of weed prevention and control efforts continues at the local, County, State, regional, and national levels. Fifty-four cooperative efforts are listed in Appendix L.

2. The Weed Seed Free Feed and Straw program started on Federal lands in Madison County in 1989. It has since become a Forest and Region-wide requirement. This program requires all hay, straw and processed feeds entering the Forest to be certified free of weed seed. The certification program is controlled by the Montana State Department of Agriculture and relies on a field survey of crops prior to harvest.

3. The Off Highway Vehicle (OHV) amendment for Region One was implemented in January 2001. Off road or trail use by OHVs is restricted and will reduce one vector of weed spread. The first year focused on public education of riders in the field. In 2002 the enforcement phase of the amendment will result in citations instead of warnings.

4. The R1/R4 Best Management Practices for Weed Control (BMPs,) are relatively new, adopted in 2000. (See Appendix H). They specify incorporation of weed prevention and control through project layout, design, alternative evaluation and project decisions to reduce potential sites for weed establishment.

Only herbicides registered by the Environmental Protection Agency (EPA) for weed control will be used. Application rates and methods will meet EPA label requirements. In some instances more restrictive, site-specific measures will be applied as described in the mitigation section on page 2-13. Detailed components of the proposed action are described under Alternative 1 in Chapter 2 of this document. Direct weed control measures include treatments to eradicate or control existing weed infestations.

Concerns about toxic effects of herbicides expressed in the comments on the Draft EIS are addressed in the Risk Assessment for Herbicide Use in Forest Service Regions 1, 2, 3, 4 and 10 and on Bonneville Power Administration Sites September 1992. We incorporate that Assessment by reference. The document is available in the Project File at the Supervisor's Office in Dillon and at: http://www.fs.fed.us/foresthealth/pesticide/health.htm

The proposed action would treat about 7,000 acres annually with herbicides from the ground, and about 9,000 acres annually from the air. Biological agents will be used to treat fifty to sixty acres. Smaller sites, about 35 acres will be treated mostly by hand pulling. This includes areas near water where herbicides and other methods are inappropriate as described in Table 2.3.1 on page 2-4. This program will continue for 10 years, unless monitoring indicates a need for change. The proposal includes prevention, detection, survey and monitoring. Weed category, funding, invasiveness of the species, potential for off-site spread, weather and ecological importance or rarity of the site, will determine priority for control treatment on an infested site.

The proposal allows treatment of a certain amount of new infestations as long as the acres treated don't exceed the acres proposed for treatment in this EIS. As weed infestation conditions vary over time, treatment priority will vary based upon conditions. Treatment will be determined by the criteria described on page 2-4 and appropriate mitigation will apply. New sites will be mapped and added to annual inventories for control.

1.4 PROJECT MANAGEMENT DIRECTION

Background: Noxious weeds have established themselves throughout southwestern Montana. They spread rapidly because of prolific seed production, a lack of natural enemies, the ability to rapidly establish on disturbed areas and increased transport of seed from increased Forest use. Weeds compete with desirable native vegetation, reduce wildlife and plant habitat, and indirectly affect wildland related recreation opportunities, grazing management and scenic quality (Hirsch and Leitch, 1996). In some instances weeds may also impact human health.

The Forest is directed by law, regulation, and agency policy to treat weeds. The following laws give broad authority for control of weeds on National Forest System land, and several laws and regulations specifically provide for control of such weeds.

Executive Order (03 February 1999). Directs Federal Agencies to prevent and control invasive species.

The Federal Noxious Weed Act of 1974 (PL 93-629). Authorizes the Secretary of Agriculture to cooperate with other agencies to control and prevent noxious weeds.

The Montana Noxious Weed Law 1948, amended in 1991. Provides for designation of noxious weeds in the State, direction of control efforts, registration of pesticides and licensing of applicators, and enforcement of statutes. The law delegates enforcement to County Commissioners.

Carlson-Foley Act of 1968 (PL 90-583). Directs Federal Agencies to permit control of noxious weeds on Federal lands, by State and local governments on a re-imbursement basis.

36 CFR 222.8. Directs the Forest Service to cooperate with local weed control Districts to analyze and develop noxious weed control programs.

The Federal Land Policy Management Act of 1976 (PL 94-579). Authorizes control of weeds on rangeland.

The National Forest Management Act of 1976 (PL-94-588). Authorizes removal of deleterious plant growth.

Forest Service Manual 2259.03. Directs Forest officers to control noxious weeds on National Forest System lands, and cooperate fully with State, County and Federal officials in implementing 36 CFR 222.8 and the Carlson-Foley Act.

Existing Forest Plans. Both the Beaverhead and Deerlodge National Forests direct control of noxious weeds as priority items (Page II-9, BNFP; Page II-3, DNFP):

Existing Weed Control Plans. For each Forest a Record of Decision (ROD) is in place for the control of weeds, the 1987 Beaverhead National Forest Noxious Weed and Poisonous Plant Control ROD, and the 1989 Deerlodge National Forest Noxious Weed Control Program ROD. A modification in 1987 of the Deerlodge National Forest analysis and decision added treatment areas, weed species and additional mitigation; particularly in the Rock Creek drainage. Numerous, additional decisions that tier to these documents have also been made for specific projects such as road and trail construction, timber sales, grazing management and special uses.

1.5 PROJECT OBJECTIVES

Noxious weeds pose an increasing threat to wildland ecosystems, croplands and other plant communities throughout the BDNF. All ecosystems (including forests, rangelands, wetlands and water bodies) are vulnerable to invasion. The purpose of this proposal is to provide a weed control program to:

- Protect the biodiversity of the BDNF by preventing or limiting the spread of weeds that could alter desired plant community composition and function.
- Eliminate new invaders (species not previously reported) before they become established on National Forest lands.
- Reduce weed seed sources at trailheads and dispersed campsites, along main roads, trails, power line corridors, and in wildlife forage habitats.
- Prevent or limit the spread of established weed species in weed free areas.
- Protect sensitive and unique habitats (including research natural areas, wetlands, and sensitive plant populations) from invasion by weeds.
- Meet the Northern Region's goal of providing an aggressive noxious weed control program.

1.6 SCOPE OF THE PROPOSED ACTION

The scope of this action is limited to prevention and control actions on BDNF lands infested with weeds, as described in Chapter 2. Activities may occur in all management areas described in the Beaverhead (1986) and Deerlodge (1987) Forest Plans, including wilderness and roadless lands.

This action will not replace existing weed control actions for which valid NEPA decisions are in place on the Forest. Instead, this proposal adds weed control options to decisions, and will allow the most effective and safest implementation of weed control on infested Forest sites. These controls include methods analyzed in previous projects. Integrated Weed Management, as described in the proposed action, would begin in 2002 and continue for 10 years or until conditions change.

1.7 SCOPE OF THE ANALYSIS

This EIS documents the specific effects of weed control as described in the proposed action, and two other alternatives. It is not a programmatic analysis nor does it involve management of the various types of use of the BDNF. The analysis of effects disclosed in this document includes the range of connected and cumulative actions and impacts to be considered:

1.8 DECISION TO BE MADE

Janette S. Kaiser, Supervisor of the Beaverhead-Deerlodge National Forest, is the Responsible Official for the decision on this proposal. Her decision addresses the following:

- What level of weed control to implement on the Beaverhead-Deerlodge National Forest.
- Where and what kind of weed controls will be used.
- What measures will be required to appropriately implement weed control methods.

- Whether aerial application of herbicides can be implemented.

The following actions are outside of the scope of this proposal and are not included in the decision. These actions are considered in the analysis of the effects of the proposed action, but each item is independent of this decision. The following items are therefore outside of the scope of this decision:

- Changes in the level of wildland fire suppression, strategies and tactics, and decisions on whether or not to control wildfire.
- Changes in travel, road use and access.
- Changes in land use and Forest management objective.

Issue #2: Herbicide risk to humans, animals and plants

Some people say herbicides may present a risk to Forest users, animals and native plants. Although the herbicides proposed for weed control have gone through rigorous scientific testing and government approval, some people perceive the use of these herbicides is unsafe. Alternative 2 addresses this issue by limiting direct weed control to only three methods: biological, cultural, and mechanical.

Impacts are measured by potential for herbicides to have an impact on non-target plants, fish, animals, water quality, and people.

Issue #3: Unknown risks of aerial spraying

A related public concern contends the impacts of herbicides would increase with aerial application. Although widely used on adjacent lands, aerial application is not authorized under existing weed control plans. Ground application of herbicides has been part of existing weed control since the late 1980s and the effects of authorized herbicides used are well known. Alternative 3 addresses this issue by providing the same level of control under the existing 1987 Beaverhead National Forest Noxious Weed and Poisonous Plant Control Record Of Decision, and 1989 Deerlodge National Forest Noxious Weed Control Decision.

Impacts will be measured by changes in plant community composition and structure, loss of native vegetation or plant populations, and change in habitat function.

2.3 ALTERNATIVES CONSIDERED IN DETAIL

Three alternatives are analyzed in detail to sharply define the range of tradeoffs between the identified issues. Differences between the amount and type of treatments provided by each alternative are provided in Tables 2.4.2.

2.3.1 Alternative 1: Proposed Action

Alternative 1 includes existing methods of weed control, which include biologic and mechanical control in conjunction with prevention and education with the addition of aerial herbicide application on 9,028 infested acres. These areas are identified on the maps in Appendix B. The size of the Forest, 3.3 million acres, requires the use of large-scale maps to show proposed treatment areas in this document. Site-specific maps (An example is available in Vegetation, Project File) are maintained at each Ranger District as part of monitoring records.

Weeds do not follow ownership boundaries; therefore this proposal prescribes coordination between public and private land managers for treatment, education and prevention. Because herbicides are in use under existing weed plans, proposed alternatives are compared by method of application.

Under this alternative new weed species will be treated as soon as identified, by appropriate methods and mitigation measures as described in this EUS, will apply. New infestations will be treated under this Alternative as long as the acres treated remain within the limits described in this document. If new infestations result in treatment beyond identified acres further analysis under NEPA will be required.

One feature of Alternative 1 is the flexibility to use updated agents as they are registered and approved by the EPA. All herbicides will be applied according to label specifications; or when additional mitigation

is required by Forest Service policy as described in this chapter. Impacts on soil and water will be mitigated to meet Montana Water Quality Standards and Pesticide Application Requirements, Northern Region Soil and Water Standards, Beaverhead, and Deerlodge National Forest Plan Standards.

Herbicides, like biological agents, go through an extensive screening and testing process before they are registered for use by the U.S. Environmental Protection Agency, (EPA). Initial pesticide registrations with the U.S. Environmental Protection Agency typically require a minimum of 120 tests, take seven to ten years to complete and cost between $30 and $50 million. Herbicide labels have the force of law and include safe handling practices, application rates and practices to avoid undesirable impacts to humans and the environment. We incorporate this and additional information about EPA screening of herbicides by reference from the Lolo National Forest Big Game Winter Range and Burned Area Weed Management FEIS, 2001, in the Project File.

Improper aerial application will not be allowed. All herbicide applicators whether Forest Service or contractor employees, will follow label instructions. A field inspector will be on-site during all aerial applications to monitor drift and compliance with label specifications. Label information is available in the Project File and at http://infoventures.com/e-hlth/, an Environmental Health Reference and Resource Materials website.

The Risk Assessment for Herbicide Use in Forest Service Regions 1, 2, 3, 4, and 10 and on Bonneville Power Administration Sites, 1992 provides detailed information about herbicide use. This document is available in the project file at the BDNF Supervisor's Office in Dillon. There is also a website address for that publication: http://www.fs.fed.us/foresthealth/pesticide/health.htm

Direct Control: Direct methods will be applied annually on approximately 16,000 (37%) of the current 43,000 weed-infested acres on the Forest. This projection may include annual aerial application of herbicides on approximately 9,000 acres and ground application on 7000 acres. Annual funding levels determine actual acres of treatment. Mechanical treatment, mostly hand pulling, is proposed for 35 acres annually and biological treatments will be implemented on about 125 acres. See Appendix I for the short history of biological control on the Forest and records of release sites.

Alternative 1 considers all EPA registered herbicides approved for weed control, including herbicides developed and approved for use in the future. Registered herbicides for Alternatives 1 and 3 are compared in Tables 2.6.3 and 2.6.4 on page 2-12. Herbicides would be applied according to label instructions and specifications or Forest Service policy whichever provides the most protection. Some biological controls in use are Knapweed gall flies (Urophora affinis and U. quadrifasciata) Knapweed gallfly (Latin binomial,) and Leafy spurge moth (Apthona nigris-cutis.) All biological agents would be released according to APHIS requirements, or Forest Service policy, whichever is more protective. A list of release sites is located in Appendix I. New agents may be substituted if more appropriate, or current agents are not available or have been found ecologically harmful.

Indirect Control: Indirect methods comprise detection, prevention, and education. Survey, detection, and monitoring activities will be accomplished on about half of the infested acres every year. Prevention measures include OHV travel restrictions, vehicle cleaning, livestock management, and other related practices. Current education programs, publications, postings news releases and cooperation with other agencies will continue until monitoring indicates a need for change. The acres and type of control measures implemented on National Forest System lands in this Alternative are displayed in Table 2.4.2.

Mitigation measures are identified on page 2-13 and will be utilized as appropriate for specific site conditions. Figure 2.3.1, displays the decision process used to determine type of treatment or each weed infestation site.

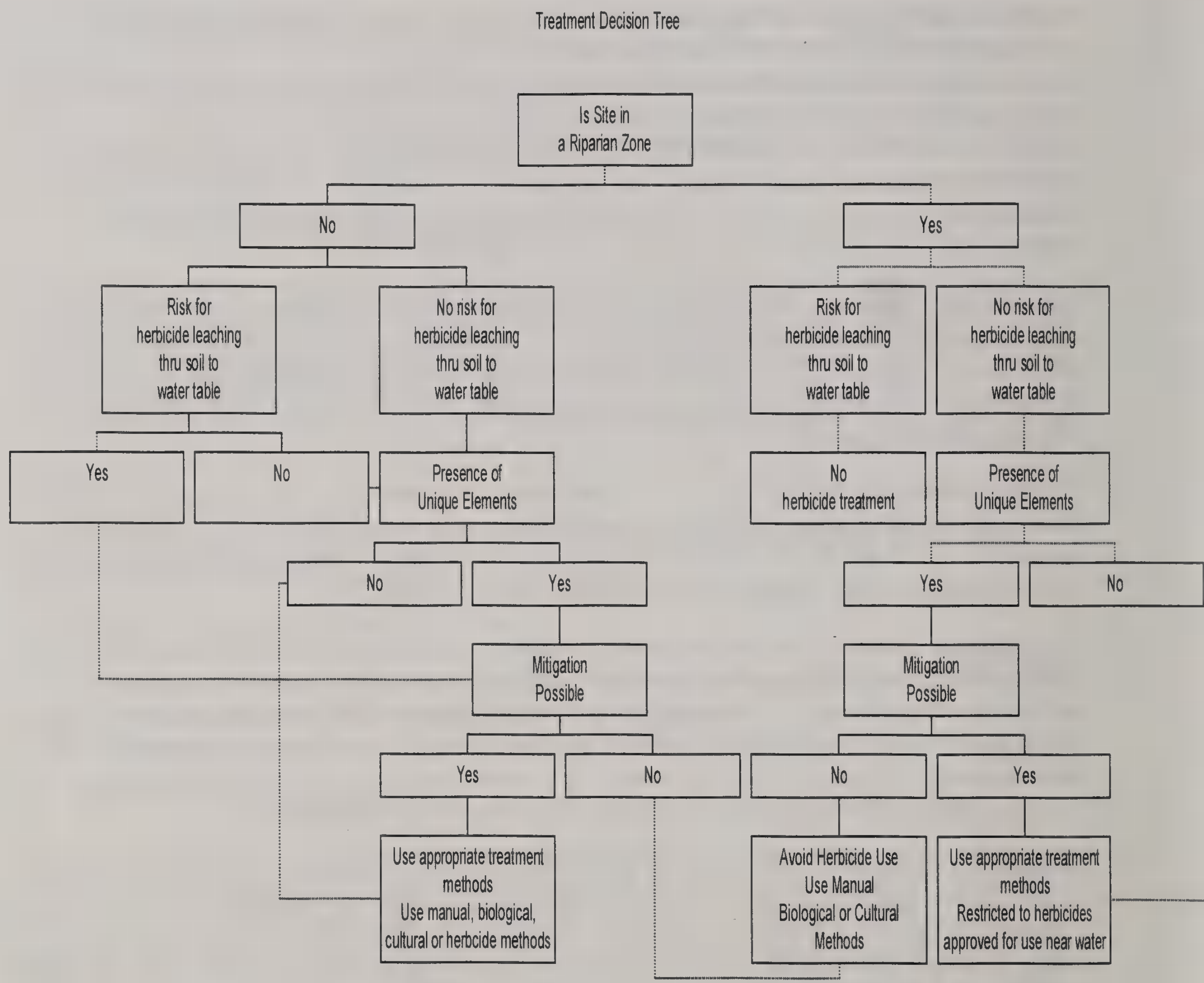


Figure 2.3.1 Flow chart of decision process for determination of appropriate treatment by site characteristics.

Selection methods for aerial application sites

Sites attributed in Appendix B, for aerial application have only been evaluated as appropriate for aerial application. Pretreatment surveys by weed coordinators determine the most appropriate methods to eliminate the infestation. Funding and workforce available also influence accomplishment of targets.

The first test for aerial application is whether the herbicide can be delivered to the target weed. If overstory vegetation prevents herbicides from getting to the weed then aerial application is not warranted. This primarily eliminates weed infestations under moderate to heavy forest canopy. When a site is listed for potential aerial application it falls into one of the following categories.

1. The infestation covers a large area and would be most efficiently treated from the air. These sites are generally over 20 acres with fairly dense weed coverage. (See page 3-15)

2. The infestation is located on rough, steep terrain preventing ground application and is too dangerous for employees on foot. (See page 3-15)

3. The infestation is very remote requiring an inordinate amount of time for crews to arrive and apply ground treatment.

The first item takes into account the potential for a weed infestation to logically fit into a coordinated weed control program with adjacent landowners. These sites might currently be treated by ground methods. They would only be more efficiently treated by air if adjacent non-Forest land were treated at the same time.

2.3.2 Alternative 2: No Use of Herbicides

Alternative 2 limits direct noxious weed control to three methods – biological, cultural and mechanical. Herbicides will not be used. The issue driving this Alternative is perceived health risks to people, animals and plants from exposure to herbicides. It addresses a comment on the Draft EIS that the Forest Service relies too heavily on herbicides and must consider non-herbicide treatments.

Direct Control: Control methods would be limited to mechanical methods (hand-pulling, clipping, and mowing weeds), cultural (grazing, re-vegetation) and biological control methods (parasites, pathogens). Approximately 1600 acres of weed infestations (about 2% of the total acres of infestation) are identified for annual treatment by direct methods.

Indirect Control: A multiyear Integrated Weed Management approach would continue. Prevention, detection and education are the same as described in Alternatives 1 and 3.

The current level of mechanical and biological treatments would increase in the absence of herbicide treatment. The estimate of acres was based on a very general upper feasible limit for manual control. The amount was determined by dividing the cost of hand pulling, per acre, by the 1999 program budget, See Table 2.4.2.

2.3.3 Alternative 3: No Action (continue current management)

Alternative 3 provides the same level of control authorized by the1987 Beaverhead NF Noxious Weed and Poisonous Plant Control ROD, and 1989 Deerlodge National Forest Noxious Weed Control ROD. This Alternative is provided to address the public concern about increased impact of aerial application of herbicides. Herbicides would be used on approximately 7,000 (20%) acres of weeds, every year.

The Beaverhead National Forest Decision authorizes a multiyear, integrated noxious weed control program that combines mechanical, manual, biological, and herbicide treatment, as appropriate, for weed-infested sites. Herbicides identified for use are 2,4-D, Picloram, Dicamba and Glyphosate. The Decision allows 7,680 acres of weeds to be directly treated, annually and anticipated a decline in treatment acres over time. Treatments were expected to be effective at 1987 infestation levels.

The Deerlodge National Forest decision authorizes a multi-year, fully integrated weed control program combining herbicides with biological, and mechanical control methods. The 1989-ROD authorizes the treatment of 4,437 acres annually. Herbicides identified for use are 2,4-D, and Picloram The estimate of identified acres was based on environmental conditions and budget constraints.

Direct Control: These methods include: hand-pulling, clipping, and mowing, biological control such as weed parasites and pathogens at the same level as Alternative 1. Herbicides used under this alternative are limited to herbicides for weed control shown in Table 2.6.3. All herbicide application would be according to label specifications, with additional mitigation when called for by Forest Service policy.

Indirect Control Methods such as prevention, detection and education will be the same as methods described under Alternative 1.

2.4 ECONOMIC COMPARISON

This decision is about how to, not whether to, manage weeds on the BDNF. The focus of the document is not economics but they are relevant to a degree. This section provides the decision maker comparative information on the relative cost per acre of the alternatives. The figures are taken from expenditures supplied by District weed coordinators for 1998 thru 2001. (See Economic Analysis, Project File) Table 2.4.3 displays a relative cost comparison by acres for Alternatives.

Average appropriations for weed control are about $225,000 annually. Expenditures are increased by various grants from partnership projects and Knutson-Vandenburg Act (KV) funds. KV dollars come from forest project funds and fluctuate with the level of activity on each District. All totaled the average expenditure; forest wide, per year is $311,537.

Many variables affect cost such as terrain, type of treatment and distance from a road. Ground herbicides generally mean vehicle-mounted spraying, about $80 per acre using Tordon 22-K, the most commonly used herbicide on the Forest for spotted knapweed. Backpack sprayers cost a minimum of $200 per acre and are used less. Difficult access increases all costs. For this comparison we use $80 per acre for ground treatment.

Biological controls have not been in use long enough to show results by acre and are included as an annual cost based on the trend toward collection rather than purchase of control agents (bugs). Cost

represents wages for 2 people travel to a collection site. Details of the history of biological control on the BDNF are explained in Appendix I.

Hand pulling is the only mechanical control practical on many parts of the forest. The cost is based on estimates in the project file. The Dillon District Weed Coordinator estimates that 2 people can pull a half-acre of weeds per day. The cost to government, per day, for a GS-5 seasonal is $102.51. An acre of weeds takes 4 people one day, which costs $410 per acre.

Aerial application costs include both fixed wing and helicopters and varies between $18 to $25 dollars per acre. The comparison uses $22.

Actual ability to treat weeds depends on funding allocated by Congress. The estimate of acres for Alternative 2 assumes no change in funding for weed control. In the DEIS, the same formula was applied without accounting for bio-control costs. Meeting notes (IDT Notes, May 2000, Project File) explain the acres identified for Alternative 2 as "an upper feasible limit for manual controls based upon budget and workforce constraints. The limit was very general with the understanding that it was of the right magnitude, but not necessarily precise, based on the cost of hand pulling per acre by the 1999 program budget."

Table: 2.4.1 Estimated Cost Comparison

Treatment	Cost per acre
Hand pulling	$410
Ground Applied.	$160
Aerial Application	$22
Biologic Control.	$3000 average. annual cost

Biologic controls (bugs) are not included in this table because the program has not been in use long enough to show results by acre. The Forest averages about $3000.00 per year to collect and release bugs. (See Appendix I).

Table 2.4.2: Summary of Annual Direct Noxious Weed Control Acres by Method.

Alternative	Biological Control	Hand Pulling	Ground Herbicide Application	Aerial Herbicide Application	Total Annual Treatments	Percent of BDNF land
Alternative 1	125	35	6831	*9028	16019	.48%
Alternative 2	*275	542	0	0	1750	.05%
Alternative 3	125	35	*6981	0	7141	.22%

** These figures include an increase of 150 acres from the recent transfer of administrative responsibility for a 150-acre horse pasture from the BLM to the Pintler Ranger District*

The acres proposed for treatment under Alternatives 1 and 3 are half of acres represented on maps in Appendix B. To reduce the potential for some herbicides to accumulate in harmful amounts, sites are treated every other year. The acres under Alternative 2 are calculated using an average allocation of $225,000 minus the average expense for collecting and releasing bugs of $3,000 and dividing the

balance by cost per acre for hand pulling. To provide a relative cost comparison figures from Table 2.4.2 provide the comparison in Table 2.4.3.

Table 2.4.3: Relative Cost Per Acre by Alternative

Relative Cost per Acre	*Alternative 1*	*Alternative 2*	*Alternative 3*
Aerial $22.00	$198,616	0	0
Ground based $80.00	$546,480	0	$558,480
Mechanical/Manual $410.00	$ 14,350	$222,220	$ 14,350
Biological Annual Cost	$ 3,000	$ 3,000	$ 3, 000
TOTAL	$762,446	$225,220	$575,830
Relative Cost	$47.60 per acre$	$128.70 per acre	$80.60 per acre

Figures based on acres in Table 2.4.2 on the previous page.

2.5 ALTERNATIVES CONSIDERED BUT NOT GIVEN DETAILED STUDY

Based upon issues and internal concerns, a wider range of alternatives was considered by the Interdisciplinary Team. Three additional alternatives were eliminated for consideration as described in this section.

An alternative that did not make any effort to control weeds was considered, but not analyzed. No management would be inconsistent with Forest Service Policy and the Chief's Natural Resource Agenda (Dombeck 1998). This, and other State laws, Federal regulations and policies direct the Forest Service to manage the adverse effects of noxious weeds. Uncontrolled rate of spread, establishment and adverse effects of weeds on resources are referenced for comparison of actions analyzed in detail. Because this analysis is available and because not controlling weeds is not a reasonable alternative, this alternative was eliminated from further study.

An alternative similar to Alternative 2 (no herbicides) comprised of direct, non-herbicide controls on all infestations was considered. It would require adequate funding and staffing to allow all known weed infestations to be treated by mechanical, cultural and biological methods only. Based upon estimated unit costs of mechanical treatments the scale of treatment would be magnitudes larger than any available funding not to mention staff. This alternative was not analyzed in detail, as there is no indication such a large increase in the program budget could be assumed, and as such is only speculative.

A third alternative with less aerial application and more ground-based spraying was considered in response to comments on the Draft EIS. The difference in acreages treated by air and ground is less than ½ a percent and would not provide a distinct comparison. Therefore the alternative was not developed.

2.6 FEATURES COMMON TO ALL ACTION ALTERNATIVES

To address laws, requirements, standards and guidelines for both Forest Plans, and to mitigate adverse impacts from the proposal, a number of features will be common to all action alternatives. These features include assumptions about present and foreseeable actions, criteria and specifications

to meet, measures to reduce, and adverse impacts to the environment. The following, specific features apply to all action alternatives.

2.6.1 Prevention and Education

Prevention and education as described in Appendix L are considered indirect measures for weed control in all Alternatives. Prevention measures for Forest project management, the R1/R4 Noxious Weed Best Management Practices adopted in 2000, are described in detail in Appendix H.

2.6.2 Environmental Justice

Executive Order 12898, issued in 1994 ordered Federal Agencies to identify and address any adverse human health and environmental effects of agency programs that disproportionately impact minority and low-income populations. At this time, no minority or low-income communities have been identified in southwest Montana.

2.6.3 Native American Treaty Rights

While the alternatives may have differing impacts on wildlife and fish, as described in Chapter 4, none of the alternatives would alter opportunities for subsistence hunting and fishing by Native American tribes. Tribes holding treaty rights for hunting and fishing on the Beaverhead-Deerlodge National Forest were contacted during scoping and also have an opportunity to comment on this DEIS.

2.7 REASONABLY FORESEEABLE ACTIONS

1. The BLM is authorized to apply herbicides and aerial spray noxious weeds on adjacent Federal lands (USDI-BLM 1991). Aerial applications are currently being used by the BLM, and this practice is anticipated to continue into the foreseeable future.

2. Seven counties adjacent to the Beaverhead-Deerlodge National Forest have active herbicide-based noxious weed control programs in place including aerial application of herbicides. These programs treat adjacent areas and all County roads, State roads and highways within and around the National Forest. County weed control is likely to continue.

3. Adjacent private lands actively control weeds with herbicides. Methods often include aerial application of herbicides, especially on large ranches. Weed control on these lands is likely to continue.

4. Forest projects, such as timber sales, post and pole sales, road maintenance, mining permits, etc., will also affect weed populations. Through recently adopted Best Management Practices weed treatment is incorporated into mitigation measures in those project plans.

5. Prevention and education programs will continue. The Weed-Seed-Free-Feed requirement on National Forest lands will remain in place and participation in State, private and County weed programs will continue.

6. The Bonneville Power Administration is authorized to use all available vegetation control methods (including aerial application of herbicides) to maintain rights-of-way, including those on National Forest.

2.7.1 Components

All Forest activities will follow Best Management Practices for Weed Prevention and Management (FSM 2080). This document is contained in Appendix H.

Integrated Weed Management will be used for undesirable plants. The 1974 Federal Noxious Weed Act defines Integrated Weed Management as a "system for planning and implementation of a program, using an interdisciplinary approach, to select a method for containing or controlling an undesirable plant species or group of species using all available methods…" Available methods used in this program may be limited by restrictions specified in each alternative.

In all action alternatives, all species targeted for treatment will be listed on the Montana State List of Noxious Weeds and/or all species on the plant control lists for Beaverhead, Deer Lodge, Granite, Jefferson, Madison, Powell or Silver Bow counties. These lists may change from year to year, and the plants we control as weeds will change with it. Current weeds listed by the State of Montana are displayed in Table 2.6.1. County lists are displayed in Table 2.6.2.

Herbicide mixtures will be allowed when combined according to instructions contained on herbicide labels. And when there are no known synergistic effects such that the toxicity of the mixture is not greater than either herbicide used alone. Herbicides used for weed control will be only those registered by the EPA, and only for applications listed on the label.

Table 2.6.1: Montana State Noxious Weeds Targeted on the BDNF.

Common Name	*Scientific Name*
Category 1*	
Leafy spurge	*Euphorbia esula*
Canada Thistle	*Cirsium arvense*
Russian knapweed	*Centaurea repens*
Spotted knapweed	*Centaurea maculosa*
Diffuse knapweed	*Centaurea difussa*
Field bindweed	*Convolulus arvensis*
Whitetop (hoary cress)	*Cardaria draba*
Dalmation toadflax	*Linaria dalmatica*
St Johnswort (goatweed)	*Hypericum perforatum*
Sulfur cinquefoil	*Potentilla recta*
Common tansy	*Tanacetum vulgare*
Ox-eye daisy	*Chrysanthemum leucanthemum*
Houndstongue	*Cynoglossum officinale*
Category 2*	
Dyer's woad	*Isatis tinctoria*
Purple loosestrife (Lythrum)	*Lythrum salicaria. L. virgatum, and crosses*
Tansy ragwort	*Senecio jacobia*
Meadow hawkweed complex	*Hieracium pratense, H. floribundum, H. piloselloides*
Orange hawkweed	*Hieracium aurantiacum*
Tall buttercup	*Ranunculus acris*
Tamarisk	*Tamarix* spp
Category 3*	
Yellow starthistle	*Centaurea solstitialis*
Commom crupina	*Crupina vulgaris*
Rush skeletonweed	*Chondrilla juncea*

**Categories of weeds are based upon their distribution across the State. Category 1 weeds are currently established and generally widespread in many counties of the State. Category 2 weeds recently introduced or rapidly spreading from current infestation sites. Category 3 weeds are those not detected or found only in small, scattered, localized infestations.*

Table 2.6.2: Additional Weeds Listed for County Plant Control, Targeted on the BDNF

Common Name	*Scientific Name*
Yellow toadflax	*Linaria vulgaris*
Musk thistle	*Carduus nutans*
Field scabious	*Knautia arvensis*
Black henbane	*Hyocyamus niger*
Burdock	*Arctium minus*
Common mullein	*Verbascum thapsus*
Bull thistle	*Cirsium vulgare*

Table 2.6.3: EPA Registered Herbicides Available for Weed Control Under Alternative 3.

Common Name	*Partial-List of Trade Names*
2,4-D	Hi-Dep, Weedar 64, Weed RHAP
Dicamba	Banvel, Banex, Trooper
Picloram	Tordon 22K
Glyphosate	Roundup, Rodeo,
Adjuvant, Surfactants & Dyes	

Table 2.6.4: EPA Registered Herbicides (as of 2001) Considered for Weed Control Under Alternative 1.

Common Name	*Partial List of Trade Name(s)*
2,4-D	*Hi-Dep, Weedar 64, Weed RHAP*
Chlorsulfuron 4-11	*Telar*
Clopyralid	*Stinger, Reclaim, Transline*
Dicamba	*Banvel, Banex, Trooper*
Glyphosate	*Roundup, Rodeo, Accord*
Hexazinone	*Velpar, Velpar ULW, Velpar L, Pronone 10G*
Imazapyr	*Arsenal, Chopper, Contain*
Metsulfuron methyl	*Escort, Ally*
Picloram	*Tordon, Grazon, Access, Pathway*
Imazapic	*Plateau*
Sulfometuron methyl	*Oust*
Triclopyr	*Garlon, Grazon*
Adjuvant, Surfactants & Dyes	

2.8 MITIGATION MEASURES

There are three types of mitigation: avoidance, minimization and compensatory. The following measures are avoidance mitigation and will apply to all action alternatives:

Human Health Risks: all herbicides will be applied with EPA registration label requirements. Extensive EPA testing has found proper use and application according to the label directions will not result in a significant health risk to humans or animals.

Human Exposure

- No aerial spraying will occur near developed campgrounds or residences.
- Campgrounds adjacent to treatment areas will be closed during the application period.
- Contact by phone or letter to notify potentially affected Indian Tribes of aerial treatment locations and times.
- Spraying dates will be adjusted to meet label requirements for game animals that may be directly exposed to herbicide applications prior to harvest.
- Posting and notification of areas to be treated with herbicides will meet Montana State requirements.

Water Quality

- Herbicides will not be applied to open water. Mitigation will apply on sites where leaching to ground water is possible. See decision table on page 2-4. Hand pulling will be employed where herbicide use is inappropriate.
- Aerial application will maintain a 300-foot buffer from open water in response to concerns about amphibians as well as streams occupied by westslope cutthroat and bull trout as described next in this section. Field inspectors will provide on-site monitoring for drift and label compliance.
- Herbicides will not be used to control weeds within a 100 foot radius of any potable water spring development on the Forest
- All herbicide storage, mixing, and post-application equipment cleaning is completed in such a manner as to prevent the potential contamination of any Riparian Habitat Conservation Area, perennial or intermittent waterway, unprotected ephemeral waterway, or wetland.
- Herbicide applicators shall carry spill containment equipment, be familiar with and carry an Herbicide Emergency Spill Plan. (Appendix F)

Fisheries

In addition to water quality mitigation measures, and protection for waters occupied by bull trout and west slope cutthroat trout. The following measures have been modified to respond to concerns expressed during the comment period on the Draft EIS.

- A 300-foot no aerial treatment buffer will be used next to any open water, which includes all sport fishery streams Buffer zones will be delineated and reviewed with the pilot prior to application.

- Use of Tordon 22K will not exceed application of 335 lbs of the active ingredient picloram, within the same 12 month period, in each of the following 6th code watersheds; Stony, Gird, Boulder Low, South Boulder, and Middle Fork Rock. Similarly, use of Tordon 22k will not exceed application of 225 lbs of the active ingredient picloram, within the same 120-month period, in the Lost Flint, Tin Can Gulch, and Basin-Boulder 6th code watersheds. If treatment in any of these watersheds is necessary, beyond the allowable amount of picloram, another herbicide will be used such that effects on bull trout, westslope cutthroat trout and other sensitive aquatic species will be discountable.

- Herbicides will not be sprayed within 15 feet of stream channels occupied by westslope cutthroat or bull trout. Within this zone herbicide application will be limited to techniques that do not require sprays, such as wiping, wicking, painting, etc.

- No ester formulations of herbicides will be used.

- To prevent application prior to extreme rain events, herbicide applicators will obtain a weather forecast for the treatment area prior to initiating a spraying project and follow label instructions.

- Aerial herbicide application near streams, ponds, or wetlands will occur only when winds are 6 mph or less and blowing away from these areas. Aircraft smokers, smoke bombs, or on-site wind monitoring will be used to determine wind direction near sensitive aquatic resources.

- Helicopter service landings or fuel storage is prohibited within 300 feet of fish bearing streams and lakes, 150 feet of other perennial streams, or 100 feet of intermittent streams, springs, seeps, wetlands, or ponds.

A field inspector will be present during all aerial application to monitor drift using 12" x 12" Spray detection cards placed in buffer areas along any stream or lake comprising a sport fishery, or waters important for Threatened, Endangered or Sensitive (TES) aquatic species. Cards will be placed prior to herbicide application and will be sufficient in number and distribution to adequately determine when drift of herbicide into the buffer area exceeds acceptable levels.

Aerial application along open water will be suspended and procedures changed whenever:

- 50% or more, of the spray detection cards placed between 200 and 250 feet from the stream display droplet contact; or

- 30% or more, of the spray detection cards placed between 150 and 200 feet from the stream display droplet contact, or

- 10% or more, of the spray detection cards placed between 50 and 100 feet from the stream, display droplet contact, or

- Any spray detection card placed within 10 feet of the stream displays droplet contact.

Western Toads and Leopard Frogs

When ground application of appropriate herbicide is immediately adjacent to a water body, surveys of the treatment area will be required. If leopard frogs; mature adult western toads or concentrations of recently metamorphosed immature adult western toads are identified, the extent of distribution within the proposed treatment area will be marked on the ground and reported to the district fisheries biologist and weed coordinator and within 2 days.

If treatment is not possible without directly spraying individuals then hand pulling or wick application could be applied. Otherwise, ground application of herbicides within the marked area will be delayed until individuals disperse,

Big Game Winter Range:

Mitigation measures such as timing, type of herbicide, mixture, rates, etc., will be used to minimize loss of winter forage from spraying. Weed-specific herbicides such as Clopyralid will be used on big game winter range. The agency will coordinate with Montana Fish, Wildlife & Parks before aerial spraying of big game winter range begins.

Bald Eagle Nests

Bald Eagle nests on the BDNF, as described in the Wildlife BA are in timbered stands near lakes and streams, usually within the 300-foot no-aerial spray buffer from open water. Pre-treatment surveys will ensure there are no nests in or near the spray area. Should a nest be identified within or near a treatment area, mitigation involves treatment postponed until late August as described in the Wildlife Biological Assessment in Appendix M.

Sensitive Plants

No herbicide will be applied directly on sensitive plants during spot applications and a 100' buffer will be employed around known populations of sensitive plants during broadcast applications (including aerial). All aerial treatment areas will be surveyed for sensitive plants prior to initial spraying.

2.9 MONITORING

Weed infestations and control actions are monitored and tracked in a forest level weed database. Annual surveys of infestations will continue. Descriptions of existing District weed monitoring programs and examples of site reports are in the project file. Date of discovery, location, weed species, condition, and distribution are recorded for each infested site. Treatment method (herbicide type, brand, and application rate if applicable,) date, and results are also recorded. This information is available at each District and provides long-term information about the effectiveness of control measures under various conditions.

Annual reports from the database that show treatment accomplishments, (MAR Reports), will be compared with targets in this EIS for compliance. When the reports show treatment levels above 16,019 acres, additional acres for treatment will be identified and reviewed under the NEPA process.

2.10 COMPARISON OF THE ALTERNATIVES

With each alternative action, there is a trade-off between beneficial and adverse impacts. This section focuses on issues identified during the scoping process described in the early part of this Chapter. Trade-offs are compared based upon the environmental effects identified in more detail in Chapter 4.

2.11 COMPARISON OF TRADE-OFFS BY ISSUE

The adverse impacts of uncontrolled weed spread and the impacts of methods used to control weeds have been identified as important issues considered for evaluation of trade-offs between alternatives.

Important components of these issues are impacts to human health, non target plants, animals, fish; soils and waters on the BDNF. These tradeoffs are compared in Table 2.9.1. Impacts are based upon the application of appropriate mitigation discussed here.

Table 2.9.1: Summary of Trade-offs and Potential Impacts Between Alternatives by Issues and Objectives

Issue or Objective	***Potential Impacts***		
	Alternative 1	***Alternative 2***	***Alternative 3***
Impacts of weeds • Change in plant community composition and structure. • Loss of sensitive plant populations. • Human health (described in Ch.3) • Change in water quality or beneficial use • Change in soil quality or productivity	Provides highest level of protection for native plant community from weed invasion. Reduces weed-caused impacts to soil and water.	Provides lowest level of protection for native plant community from weed invasion. No reduction of weed-caused impacts to soil and water.	Provides about half the level of protection provided by Alternative 1 for native plant communities from weed invasion, and reduced weed-caused impacts to soil and water.
Impacts of using herbicides • To human health • To fish and animals • To non-target plants • To water quality or beneficial use	No anticipated, adverse impacts from properly used herbicides as required by Label specifications or Forest Service Policy.	N/A – no herbicides used.	No anticipated, adverse impacts from properly used herbicides as required by Label specifications or Forest Service Policy.
Additional risks of Aerial Spraying • To human health • To fish and animals • To non-target plants	Mitigation provides no additional, measurable impacts to humans, fish or animals. There is potential for adverse impacts to non-target plants during aerial applications. The impact will affect less than 0.002% of the Forest annually. Mitigation will protect sensitive plants.	N/A – no aerial herbicide application.	N/A – no aerial herbicide application.
Effectiveness of control actions • Inhibit spread • Reduce or eliminate existing infestations	High High	Low Low	Medium High on accessible sites
Constraint to users of National Forest	Temporary access restrictions to sites during treatment	No additional constraints to Forest use required	Temporary access restrictions to sites during treatment.

Issue or Objective	Potential Impacts		
	Alternative 1	Alternative 2	Alternative 3
Meets Soil Quality Standards	Yes	Yes	Yes
Meets Water Quality Standards	Yes	Yes	Yes

Annual treatment needs are based upon the collective experience of weed control managers on the Forest (PF:IDT 04/06/00 notes) and annual weed control reports (Project File, Vegetation.

CHAPTER 3 – AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This Chapter describes existing conditions of specific environmental components that may be affected by alternative actions. Management direction prescribed by the 1986 Beaverhead National Forest Plan (BNFP) and the 1987 Deerlodge National Forest Plan (DNFP) is briefly described, followed by descriptions of the affected resources. The level of detail in each description is commensurate with the importance of potential impacts and the amount of information necessary to understand the effects of the actions. It also provides the context for assessing how each alternative responds to the issues identified in Chapter 2.

3.2 FOREST PLAN MANAGEMENT DIRECTION

The Beaverhead and Deerlodge National Forests were combined into one administrative unit in 1996. However, until new direction is provided, management continues to operate under direction contained in the individual Forest Plan for each Forest.

Management direction for the Beaverhead National Forest is found in the 1986 Beaverhead National Forest Plan (BNFP). Management direction for the Deerlodge National Forest is found in the 1987 Deerlodge National Forest Plan (DNFP). The following summary highlights the management direction relevant to this proposal.

Beaverhead National Forest: Goals, Objectives and Standards, under the Forest Plan, relevant to the Proposed Action are:

- Noxious weed control conducted in cooperation with other agencies, private landowners, and public land managers, has high priority in the Forest program (Objectives, Domestic Livestock, BNFP, page II-9).
- An aggressive noxious weed control program will be continued and expanded to reduce or eliminate noxious weeds, or at least, confine present infestations and prevent establishment of new infestations (Standards, Noxious Weeds, BNFP, page II-37). The program will be implemented in accordance with the Beaverhead National Forest Environmental Impact Statement on Noxious Weeds Control.

Deerlodge National Forest: Goals, Objectives and Standards under the Forest Plan, relevant to the Proposed Action are:

- Noxious weed control will be emphasized (Objectives, Range, DNFP, page II-3).
- By the end of the first decade, vegetative conditions of range will have improved through prescribed fire and noxious weed control, (Desired Future Condition of the Forest, DNFP, page II-11).
- Implement integrated weed control program coordinated with private landowners and local government Weed Control Districts. Use chemical, biological, and physical methods, including improved management practices, to confine present infestations and prevent establishment of new areas of noxious weeds (Standards, Range, DNFP, II-24).

- Pest management will be conducted under the philosophy of Integrated Pest Management. Cooperation with other Federal, State, and private landowners will be emphasized (Protection, DNFP, page II-32).

Management Area Goals, Objectives and Standards Relevant to the Proposed Action: Management area descriptions are found in Chapter 3 of both the BNFP and DNFP. These descriptions provide specific goals and management direction to achieve the Forest-wide goals, objectives and standards found in Chapter 2 of each Forest plan. Proposed actions will occur on nearly all management area allocations identified in the Forest Plans. None of the management areas restrict the control of noxious weeds. Some management areas, however, restrict motorized access. The Forest Service may use motorized vehicles to apply weed control in closed areas when necessary, by obtaining a variance. Steps will be taken to minimize tracks and prevent perceptions of unavoidable tracks, as established use trails by posting explanation signs Weed control methods will comply with motorized restrictions in wilderness areas.

3.3 AGENCY POLICY AND DIRECTION

Important policy and direction relevant to weed control is given in the Chief's Natural Resource Agenda (1998), the Northern Region Overview and the Forest Service Manual.

1998 Natural Resource Agenda. In March of 1998, Forest Service Chief Mike Dombeck presented the Agency's emphasis in management direction for the 21st century. In this Agenda was a strong emphasis on conserving and restoring degraded ecosystems, including actions to "attain desirable plant communities", and prevent exotic organisms from entering or spreading in the United States".

Northern Region Overview. In October of 1998, the Northern Region of the Forest Service published a document addressing current conditions and priority needs of ecosystem health and recreation. This overview found "Noxious weeds are one of the most serious threats to ecological integrity." (Summary, page 19.) Integrated Weed Control is identified as a priority action in the Overview (Summary, pages 19 and 20).

Forest Service Manual 2259.03 states, "Forest officers shall cooperate fully with State, County, and Federal officials in implementing 36 CFR 222.8 and sections 1 and 2 of PL 90-583 (see below). Within budgetary constraints, the Forest Service shall control to the extent practical, noxious farm weeds on all National Forest System lands."

3.4 LAWS AND REGULATIONS

The following laws and regulations give both broad and specific authority and direction for control of noxious weeds on National Forest system lands:

Executive Order 13112, Invasive Species, February 3, 1999. This order directs Federal Agencies whose actions may affect the status of invasive species to (I) prevent the introduction of invasive species, (ii) detect and respond rapidly to, and control, populations of such species in a cost-effective and environmentally sound manner, as appropriations allow.

36 CFR Sub A, Sec 222.8. ". . . The Chief, of the Forest Service, will cooperate with County or other local weed control Districts in analyzing noxious farm weed problems and developing control programs in areas which the National Forests and National Grasslands are a part."

Federal Noxious Weed Act of 1974 (sec 9) authorizes the Secretary to cooperate with other Federal and State Agencies or political subdivisions thereof, and individuals in carrying out measures to eradicate, suppress, control or prevent the spread of noxious weeds.

Public Law 90-583 (Carlson-Foley Act, October 17, 1968). Authorizes and directs heads of Federal Departments and Agencies to permit control of noxious plants by State and local governments on a re-imbursement basis in connection with similar and acceptable weed control programs being carried out on adjacent non-Federal land.

Public Law 94-579 (The Federal Land Policy and Management Act Of 1976). This act provides authority to control weeds on rangelands as part of a rangeland improvement program.

Public Law 94-588 (The National Forest Management Act of 1976). This act provides authority for removal of deleterious plant growth and undergrowth and provides for expenditures of funds to serve as a catalyst to encourage better management of private forests and rangelands.

The State of Montana County Noxious Weed Management Act provides for designation of noxious weeds within the State, and directs control efforts. Provisions are made for registration of pesticides, licensing of distributors and applicators, and enforcement of State statutes. An enforcement responsibility for the control of noxious weeds within Montana is delegated to County Commissioners through weed management District weed boards.

3.5 DESCRIPTION OF THE AFFECTED ENVIRONMENT BY RESOURCE

3.5.1 Human Environment

Affected Area: The affected area for human health risks includes all lands on the BDNF where people use the Forest. Effects are related both to the impacts of weeds on humans and the impacts of weed control. For weeds, concerns are related to the impacts from exposure to pollens and plant chemicals. For weed control, concerns are related to the exposure to toxicants found in the chemical herbicides applied to weed-infested sites. Direct and indirect impacts can be determined by assessing weed-infested where direct control measures would be applied.

In general, the presence of noxious weeds does not pose significant health threats to the majority of the population. However, some individuals are affected by allergies and minor skin irritations from certain weed species. For example, leafy spurge contains a latex-bearing sap that irritates human skin and may possibly cause blindness upon direct contact with the eye (Callihan et al. 1991). Some species of weeds, such as thistles, cause minor scrapes and irritations. Hand-pulling weeds can cause minor skin irritations in circumstances where gloves are not used.

Exposure to herbicides used to control weeds may cause a reaction in some people. The possibility of an illness or accident from exposure varies from person to person, but is considered to be low. The potential for impact is dependent on the herbicide, method of application, and length of exposure during application.

Information sources: Information for the assessment of risk to human health is based upon summaries of research and laboratory studies. The Northern Region of the Forest Service analyzed the human risk of using clopyralid, 2,4-D, Dicamba, Glysophate, Metsulfuron, Triclopyr, and Picloram to control noxious weeds (USDA Forest Service 1992 and Monnig 1988).

The Forest Service contracted with Information Ventures, Inc. to summarize ecotoxological data and human health effects based on EPA studies. Toxicity information for herbicides is reviewed to determine the levels of these chemicals that would be harmful to human health. Potential exposures and doses are estimated for workers and the general public. Toxic effect levels are compared to predicted dose levels to determine the possibility of health impacts.

Considerable data from tests on laboratory animals is available for these proposed herbicides. These test have been conducted as a requirement for EPA registration of these herbicides for use in the United States. Some of the herbicides proposed for use have not completed all the required testing or have been required to complete additional tests for final registration. Current Federal regulations allow for conditional registration pending the completion of all tests as long as no adverse effects are found in the interim. Continued use, allowed before all testing is completed, concerns some members of the public. This results in charges that "untested" herbicides are allowed on the market. All herbicides proposed for use on the Beaverhead-Deerlodge National Forest are either EPA approved and registered or EPA approved and conditionally registered. All have been assigned an EPA registration number.

All herbicides proposed for use have been subjected to long-term feeding studies that test for general systemic effects such as kidney and liver damage. In addition, tests of effects on reproductive systems, mutagenicity (birth defects), and carcinogenicity (cancer) have been conducted.

Toxicity of Herbicides: Toxicity is the inherent capacity of a substance to produce injury or death. Hazard is a function of two primary variables, potency (quantity of a chemical needed to induce harm) and exposure. It indicates the probability that injury will result from the use of a substance in a given formulation, quantity or application method.

Pesticides are not risk-free. The reason the EPA allows the use of products with the potential to cause toxicity is that, "when used according to label instructions"; the risks of the pesticide are outweighed by the benefits. Reading and following instructions on labels is the best way to insure personal safety. Toxicity tests required by EPA for pesticide registration include "Acute" (short term) or "Chronic (longer term) exposures.

Acute Toxicity: Acute toxicity can be a function of the amount of toxicant received, the route of administration, and the type of animal tested. Acute reactions tested include: oral, dermal and inhalation toxicity, acute delayed neurotoxicity, eye and dermal irritation, and dermal allergic sensitization. Table 3.5.1 displays acute toxicity categories.

Harmful effects between materials used for weed control can be compared using these acute toxicity categories. Tradeoffs of weed control effectiveness and potential harm can be evaluated based upon the potential for exposure. Table 3.5.2 compares toxicity between chemicals.

Chronic Toxicity: Chronic toxicity results from prolonged, repeated, or continuous exposure to a chemical, typically at levels lower than necessary to cause acute toxicity. It often demonstrates a delayed response. Public concerns toward pesticides generally focus on potential chronic toxicity. Sublethal poisoning or exposure may be expressed by any of the following: skin/eye irritation, nervous system disorders, reproductive system disorders, damage to other organ systems (liver, kidney, lungs, etc.), birth defects, mutations, and cancer.

The EPA evaluates carcinogenicity, teratology, reproduction, and mutagenicity study results of herbicide effects to animals during the registration process of herbicides. The study data is used to make inferences relative to human health. From these studies, chronic toxicity of herbicides proposed for use on the Beaverhead-Deerlodge National Forest can be summarized. Table 3.5.3 compares chronic effects between various chemical herbicides.

Reported or potential effects to humans: Concerns have been expressed by the public as to the potential for adverse health effects from contacting or consuming treated vegetation, water, or animals. Harmful effects from this type of exposure are low for most of the herbicides proposed for use on the Beaverhead-Deerlodge National Forest. "The exposure levels a person could receive from these sources, as a result of routine operations are below levels shown to cause harmful effects in laboratory studies." (Information Ventures 1999). Exceptions are 2,4-D, Hexazinone, Sulfometuron Methyl, and Glyphosate.

Hexazinone: "To prevent residues of hexazinone in meat or milk, do not graze domestic animals on treated areas within 30 days after treatment."

2,4-D: "To keep residues of 2,4-D out of meat or milk, do not graze dairy cattle on treated areas for 7 days after application. Do not cut hay for 30 days and do not slaughter meat animals for 3 days. Contact with dried residues on vegetation is not expected to be hazardous."

Sulfometuron Methyl: No reports of acute poisoning in humans have been found. No reports of chronic poisoning in humans have been found

Glyphosate: Most incidents reported in humans have involved skin or eye irritation in workers after exposure during mixing, loading or application of glyphosate formulations. Nausea and dizziness have also been reported after exposure. Swallowing the Roundup formulation caused mouth and throat irritation, pain in the abdomen, vomiting, low blood pressure, reduced urine output, and in some cases, death. These effects have only occurred when the concentrate was accidentally or intentionally swallowed, not as a result of the proper use of Roundup. The amount swallowed averaged about 100 milliliters (about half a cup). There are no reported cases of long-term health effects in humans due to glyphosate or its formulations. Glyphosate (Roundup) is sold over the counter at retail stores and is used on the Forest in limited applications such as vehicle parking lots.

Table 3.5.1: Toxicity Categories for Various Types of Harmful, Acute Reactions.

Toxicity Category	*Signal Word*	*Oral (Mg/kg)*	*Dermal (mg/kg)*	*Inhalation (mg/L)*	*Eye Irritation*	*Skin Irritation*
I	DANGER Poison	0 –50	0 –200	0 – 0.2	Corrosive: corneal opacity not reversible within 7 days	Corrosive
II	WARNING	>50 - 500	>200 – 2000	>0.2 – 2.0	Corneal opacity reversible within 7 days; irritation persisting for 7 days	Severe irritation at 72 hours
III	CAUTION	>500 - 5000	>2000 – 20,000	>2.0 – 20	No corneal opacity; irritation reversible within 7 days	Moderate irritation at 72 hours
IV	NONE	>5000	>20,000	>20	No irritation	Mild or slight irritation at 72 hours

Table 3.5.2: Human Hazards Based on Acute Toxicity Categories for Weed Control Herbicides *(Information Ventures, Inc., Pesticide Fact Sheet and EXTOXNET, Pesticide Information Profiles, Oregon State University).*

Herbicide	*Acute Oral Toxicity*	*Acute Dermal Toxicity*	*Acute Inhalation*	*Primary Eye Irritation*	*Primary Skin Irritation*
Picloram	Caution	Caution	Danger-Poison	Caution	None
Metsulfuron Methyl	None	Caution	Caution	Warning	Caution
Hexazinone	Caution	None	None	Danger-Poison	None
Clopyralid Methyl	Caution	Caution	Caution	Warning	None
Chlorsulfuron	None	Caution	Caution	Caution	None
Triclopyr	Caution	Caution	Caution	Caution/Danger	Caution
Imazapyr	None	Caution	Caution	Caution	Caution
2,4-D Amine	Caution	Caution	Caution	Danger-Poison	Caution
Dicamba	Caution	None	None	Danger-Poison	None
Glysophate	None	None	Caution	Warning	None
Sulfometuron Methyl	None	Caution	Caution	None	None

Table 3.5.3: Comparison of Harmful Chronic Effects of Herbicides Proposed for Controlling Weeds on the BDNF. *("No Effects" = No effects have been shown in laboratory tests and is not considered a hazard to humans. "Unlikely" = Inconsistent or isolated effects have been shown in laboratory tests and it is not considered a hazard to humans at expected exposure levels. "Unknown" = Laboratory tests are inconclusive or further testing is required.)*

Herbicide Active Ingredient	*Potential Chronic Effects*			
	Carcinogenic	*Teratogenic*	*Reproductive*	*Mutagenic*
Picloram	Unknown	No Effects	No Effects	Unlikely
Metsulfuron Methyl	No Effects	No Effects	No Effects	No Effects
Hexazinone	Unlikely	Unlikely	Unlikely	No Effects
Clopyralid Methyl	No Effects	No Effects	No Effects	No Effects
Chlorosulfuron	No Effects	No Effects	No Effects	No Effects
Triclopyr	No Effects	No Effects	No Effects	Unlikely
Imazapyr	Unknown	No Effects	Unknown	No Effects
2,4-D Amine	Unknown	Unlikely	Unlikely	Unlikely
Dicamba	No Effects	No Effects	Unlikely	No Effects
Glysophate	No Effects	No Effects	Unlikely	No Effects
Sulfometuron Methyl	No Effects	No Effects	Unlikely	No Effects

Herbicide Drift: Herbicide spray drift is the direct movement of herbicide from the target to areas where herbicide application was not intended. Movement of spray droplets or herbicide vapor causes herbicide drift. Several factors affect spray drift, the results of which are summarized in Table 3.5.4:

<u>Spray Particle Size</u> - Spray drift can be reduced by increasing droplet size, since large droplets move less than small droplets in wind. Reducing spray pressure, increasing nozzle orifice size, special drift reduction nozzles, additives that increase spray viscosity, and rearward nozzle orientation, can increase droplet size.

Method of Application - Herbicide spray drift is generally greater from aerial application than from ground application. Low-pressure ground sprayers generally produce larger spray droplets, which are released from the nozzle closer to the target than with aerial sprayers.

Distance Between Nozzle and Target - Less distance between the droplet release point (the boom arm) and the target reduces spray drift. The spray travels a shorter distance with less opportunity for drift.

Herbicide volatility - all herbicides can drift as spray droplets, but some are sufficiently volatile to cause plant injury from drift of fumes.

Relative Humidity and Temperature - low relative humidity and/or high temperature cause more rapid evaporation of spray droplets between the nozzle and target than high relative humidity and/or low temperature. Evaporation reduces droplet size, which in turn increases the potential drift of the spray droplets.

Wind Direction - Herbicides should only be applied when the wind is blowing away from non-target plants.

Wind Velocity - The amount of herbicide lost from the target area and the distance the herbicide moves will increase as wind velocity increases, so greater wind velocity will generally cause more drift.

Air Stability - Horizontal air movement is generally recognized as an important factor affecting drift, but vertical air movement is often overlooked. Vertical stable air (temperature inversion) occurs when air near the soil surface is cooler or similar in temperature to higher air. Small spray droplets can be suspended in stable air, move laterally in a light wind and impact plants downwind.

Spray Pressure - Spray pressure influences the size of droplets formed from the spray solution.

Nozzle Spray Angle - Spray angle is the angle formed between the edges of the spray pattern from a single nozzle. Nozzles with wider spray angles produce smaller spray droplets than those with narrower spray angle at the same delivery rate.

Nozzle Type - Nozzle types vary in droplet sizes produced at various spray pressures and gallons per minute output.

Air Movement around Aircraft - Vortices are irregular drifts of air around the fixed wing of airplanes or the rotary blades of helicopters. The fixed wing or rotor tip produces an updraft, while the body of the aircraft produces a downdraft. Vortices affect the deliver of spray particles accordingly.

Table 3.5.4: Effects of Drift Factors on Herbicide Drift.

Factor of Drift	More Drift	Less Drift
Spray particle size	Smaller	Larger
Release height	Higher	Lower
Wind speed	Higher	Lower
Spray pressure	Higher	Lower
Nozzle size	Smaller	Larger
Nozzle orientation	Forward	Backward

Factor of Drift	More Drift	Less Drift
Nozzle location	>3/4 wingspan	<3/4 wingspan
Air temperature	Higher	Lower
Relative humidity	Lower	Higher
Nozzle type	Small droplets	Large droplets
Air stability	Stable	Unstable
Herbicide volatility	Volatile	Non-volatile

3.5.2 Vegetation

Affected Area: The affected areas are all lands on the National Forest susceptible to infestation by noxious weeds. Components of the affected vegetation are the weed species themselves, and the native plants and plant communities they potentially displace. The affected area lies in seven counties in southwestern Montana: Beaverhead, Deer Lodge, Granite, Jefferson, Madison, Powell and Silver Bow.

Known noxious weed infestations total about 1.3% (43,000 acres) of the 3.3 million acres of the BDNF. Infested sites range in size from single plants, to infestations covering over 2,000 acres. Infestations vary in density from a few plants to a dense weed cover. Current infestations are displayed on maps in Appendix B.

WEED SPECIES

Forty plant species are currently listed as weeds on State and County noxious weed lists. Of these 29 are listed in the affected counties, and only 20 are known and mapped on the Beaverhead-Deerlodge National Forest. Weed species addressed in this analysis include all State and County listed species in the seven affected counties. See the Montana War On Weeds site for pictures and information: http://mtwow.org/Weed-ID Links.htm.)

Two primary noxious weed species make up the largest percent of infestations listed in Table 3.5.5 below. Spotted knapweed is the predominant species, found on 77% of weed infestations on the Forest. Densities are almost even divided between sparse and moderate.

Leafy spurge comprises 13% of infestations on the Forest. The other nineteen weed species, of varying densities, grow on the remaining 10% of the infestation sites. All weed species currently considered for control measures are listed in Tables 2.6.1 and 2.6.2, in Chapter 2.

Table 3.5.5: Primary Weed Species and Density

Primary Species on Treatment Site	*Plant Density Within Site*	*Percentage of Total Infestation on Forest*
Spotted Knapweed	Trace	32%
Spotted Knapweed	Low	27%
Spotted Knapweed	Moderate to High	18%
Leafy Spurge	Trace, Moderate to High	13%
Other (Table 4.3.2)	Trace to High	10%

Characteristics and occurrence of weeds, by species: Nationally, an estimated six to seven million acres of National Forest are infested with noxious or invader weeds increasing at a rate of 8-12% per year. On the BDNF, infestations are increasing at 3-5% per year, well below the national average (local rates are based upon current levels of infestation when compared with levels determined in 1987 and 1989 Weed Environmental Impact Statements).

There are many non-native plant species in the affected area. Many were purposefully planted for erosion control, and revegetation. They are benign in their impact to the natural environment because they do not compete with native vegetation. These species do not threaten native plant communities and are not considered "weeds".

However, other exotic species are extremely hardy and competitive they are able to permanently alter the structure, composition and function of native plant communities. These are identified on State and local noxious weed lists.

Every year the State and counties review their noxious weed lists to evaluate additions or deletions. The changing nature of these lists is necessary to address the rapid influx of exotic species into this country.

Montana's County Noxious Weed Control Act defines weed categories. The Beaverhead-Deerlodge National Forest has used these definitions to categorized weed species based on local infestation levels on the forest. For some species this category is different than listed on the current Montana State Noxious Weed List. Table 3.5.6 displays the weed species by category along with known presence on Ranger Districts.

Information on the biology and ecology of each species can be found in James and others 1991, Sheley and Petroff 1999, and in numerous publications provided by the Montana State Extension Service. Important weeds of particular concern in the affected area are discussed below.

Category 1 – Widespread Weeds: Species in this category are already widespread in the affected area. They infest sites on nearly all Ranger Districts. Most have been present for decades yet are still increasing their range, some steadily and others rapidly. Important category 1 weeds on the Forest are:

<u>Spotted knapweed</u> – This weed is found in every County in the State of Montana, and on all seven Ranger Districts on the Forest. The most extensive coverage found on the north end of the forest. It is a short-lived, deeply tap rooted perennial and reproduces by seed. This weed quickly establishes on disturbed soil and if untreated will rapidly dominate a site. Spotted knapweed is also known to be able to invade undisturbed, healthy rangelands.

Leafy spurge – Leafy spurge infests every County in Montana. This highly invasive, rhizomatous perennial has caused severe impacts on native habitats and agricultural lands. Leafy spurge causes serious environmental damage by completely dominating a site and excluding all other species and is found on all but one Ranger District. Most leafy spurge sites are relatively small. The largest infestations on the Forest are in the Deer Lodge Valley and the northwest side of the Tobacco Root Mountains.

Musk thistle – This thistle is found scattered across the Forest on all Ranger Districts. Infestations are generally small but can become quite extensive. Musk thistle is a biennial species. It germinates and establishes the first year as a low growing rosette of leaves. In its second year it bolts up to six feet tall, then flowers and dies. Musk thistle is benefited by disturbance and generally does not establish well in healthy, dense plant communities. The dry, open nature of many of the non-forested communities on the Forest makes them susceptible to invasion by this weed.

Category 2 – New Weeds: These species are known to occur on the BDNF, but have only recently invaded, so are still limited in geographic extent. They occur on only one or two Ranger Districts. Most are restricted to a small area such as one river drainage, or meadow. Some category 2 weeds are not noticeably increasing, while others are exhibiting exponential infestation rates. If left unchecked, Category 2 weeds are expected to transition into Category 1 in the near future. These weeds are:

Sulfur cinquefoil – This plant is a member of the rose family. There are many desirable, native species related to this weed making identification difficult. Sulfur cinquefoil is becoming one of the more serious weed species invading the State. It may even be capable of pushing out spotted knapweed from a site. Of major concern is its broad ecological amplitude. It has been shown to be able to invade healthy native plant communities. This weed has been found on three Ranger Districts. All Forest infestations are currently small, but large infestations occur just off the Forest in many locations.

St. Johns-wort – This plant, found in Montana longer than 60 years primarily in the northwest corner, is a deep-rooted perennial that reproduces both by sprouting and by seed. It is highly valued as a medicinal herb and is commercially harvested in large quantities. It can establish in either disturbed or pristine plant communities. It prefers open grasslands but can be found along roads in moist forest environments. Currently, it is found only on two of 7districts on the BDNF.

Oxeye Daisy – This pretty plant has been introduced to many areas as an ornamental. It is an aggressive weed that can form dense patches from its extensive root system and abundant seed production. Currently, oxeye daisy has been found on four of the seven Ranger Districts. Most infestations are associated with roads but the potential for expansion of the weed into native plant communities is high. It, like many weed species, has a wide range of ecological conditions where it can grow and prosper.

Category 3 – Potential Invaders: These species have not yet known to occur on the Forest. However, they are either known from nearby areas or are expected to invade our area in the near future, based on their rapid rate of spread in our direction. Many of these species have caused severe ecological damage where they have invaded. Some important Category 3 weeds are:

Dyer's woad – Dyer's woad infestations are known in southwest Montana but none have been located on the BDNF. It is an aggressive annual to short lived perennial. It is capable of dominating native plant communities. Large infestations are well established to the south in Idaho and Utah. Prevention and

early detection of this species is critical for this species. The bright yellow flowers of dyer's woad make it easy to spot and identify. Hand pulling can be effective to control new, small infestations.

Rush skeletonweed – The only known infestation of this weed are found in northwestern Montana. This species has established across millions of acres in the Pacific Northwest, primarily Washington and Idaho. Rush skeletonweed is a non-descript plant easily overlooked. It likes dry, well-drained soils along roadsides, grasslands, and sagebrush/grass communities. Once established, rush skeletonweed is difficult to control, even with herbicides.

Purple loosestrife – This weed species is unique because it invades aquatic and wetland sites. Once established, purple loosestrife can dominate a site and greatly reduces the diversity of native wetland communities. This species has come to us from ornamental plantings and can still be found in nurseries and seed catalogs. Education is important in preventing this species from being spread by unsuspecting people. No infestations are known on the BDNF.

Current Level of Infestation: Weed management on the BDNF is not new. For more than 20 years both forests have been active in partnerships and maintain active weed management programs. (See Appendix L). Funding levels vary but control activities take place every year.

Each District compiles maps of weed infestations. These continuing inventories are compiled in electronic format and available by request from the Supervisor's Office. This inventory, updated annually, includes new infestations, and expansion or reduction of known sites. The maps in Appendix B. show prescribed treatment areas under Alternative 1.

Current inventory indicates about 43,000 acres of National Forest lands infested with noxious weeds. Many have more than one weed species established. These areas represent about 1.3% of the 3.3 million acre Beaverhead-Deerlodge National Forest.

Plant density of all weed species range from less than 1% to over 25%. The majority of infestations have less than 5% weed cover. Spotted knapweed is the most abundant weed on the Forest. It is found on 78% of known infestation sites. Leafy spurge, second in abundance, occurs on 13% of infestation sites. Table 3.5.7 displays the relative abundance of the weeds found on the Forest.

NATIVE PLANT COMMUNITIES

The 3.3 million acres of the BDNF National Forest support a diverse mixture of plant communities. Vegetation communities vary from open, dry grasslands and sagebrush/grass in the valley bottoms, to dense lodgepole, subalpine fir and Douglas-fir forest at higher elevations. Subalpine/alpine grasslands, tundra and rock barrens dominate the highest elevations. Wetlands and riparian areas are scattered throughout the Forest. Table 3.5.8 displays existing community types found on the Forest. This summary was generated from Satellite Image Land Cover classification (SILC) and used 1995 satellite imagery.

Forest communities: About 70% of the BDNF consists of forest communities. Lodgepole pine, Douglas fir and subalpine fir are the major tree species found on the Forest. Douglas fir is the major component in lower elevation forests. At higher elevations, it is replaced by lodgepole pine and subalpine fir. At the very highest elevations whitebark pine becomes a major forest component.

Generally, forested communities have low potential for establishment and spread of weeds. Weeds currently affect less than one percent of forest communities on the Forest. Low elevation, dry forests are more susceptible to weed infestation. Most of the identified weed infestations are in Douglas fir, Douglas fir/lodgepole, and juniper forest types.

Recently burned forests also show increased incidence of weed infestation. Five percent of forests recently burned by wildfires have weed infestations. In 2000, about 80-100,000 acres burned in wildfires. One-fourth of these acres burned hot enough to remove forest cover. Another fourth of the trees in this area are estimated to die as a result of delayed, fire-related mortality from bark beetles and injury (BDNF Fire Assessment 2000). Table 3.5.8 (forest cover types) is based upon 1995 satellite images, and does not reflect areas burned the summer of 2000.

Non-Forested, upland plant communities: Non-forested upland communities comprise about 20% of the plant communities on the BDNF. The communities vary from scattered open meadows and sagebrush/grass slopes in the northern and western portions of the Forest, to large expansive grasslands and sagebrush/grass communities on the southern and eastern side of the Forest. Scattered stands of dry forest may occur throughout. Idaho fescue, blue bunch wheatgrass and mountain big sagebrush are the dominant species found in these communities. Plant community and species diversity are great across the Forest.

Over half of the known weed infestations are found in non-forested, upland communities. Their open, dry nature provides more suitable growing sites than the forested communities. Two percent of these comminutes have weed infestations. As in forested communities, the driest sites have the highest potential for weed invasion. Infestation rates of xeric (dry) shrub and grassland communities are more than twice that of non-forested uplands, as a whole.

Wetland and Riparian plant communities: Wetland and riparian areas are tied to streams, small meadows and seeps. Most of these features were too small to be mapped using the SILC data and make up about 2% of any landscape. Though small, these plant communities contribute to diversity across the landscape. Forest tree cover dominates riparian areas on the BDNF. Spruce and willows are common to riparian communities across the Forest. A variety of willow and sedge species dominate these sites. Forbs are also abundant and diverse in riparian and wetland communities.

Riparian sites have low potential for weed invasion compared to dry shrub and grass communities because of higher soil moisture and dense vegetation. However, weeds will invade riparian communities, and all weed species of concern can potentially become established in riparian areas. Purple loosestrife is of particular concern because it can completely dominate wetland plant cover and replace diverse native wetland plants. Purple loosestrife is not yet found on the BDNF, however large infestations are established in portions of western Montana.

Rare Native Plant Species: All species identified as Federally Endangered, Federally Threatened, Proposed for Federal Listing and Forest Service Sensitive are considered “rare” for the purposes of this analysis. Table 3.5.9 displays rare, endemic species known or suspected to occur on the BDNF.

Rarity is caused by a number of ecological, biological and social reasons. On the BDNF, most rear species are classified because of habitat limitations. Many of these species are more abundant north and south of Montana, but are on the edge of their range here. None have been classified as rare solely due to loss of habitat from invasive plant species on the BDNF.

After review of known rare plant occurrences on the Forest (Sensitive Species List, 2670 Files, and Montana Natural Heritage Program database) only one site had established weeds. The West Fork Buttes Botanical Area on the Pintler Ranger District supports *Arabis fecunda* and *Phlox kelseyi var. missoulensis*. Spotted knapweed is also established in the botanical area. Spot sprayed Clopyralid has proven effective on spotted knapweed without harming these two rare species. =(See Appendix K)

Twenty-one of the thirty-nine rare plant species found on the BDF grow in open grasslands and sagebrush/grassland communities. These are the most at risk plant communities to weed invasion. The aggressive nature of weeds allows them to quickly establish and spread. Once they gain a foothold they soon push out native species. The limited coverage of these rare plants makes them even more susceptible to loss when aggressive species dominate a site.

Table 3.5.6: Weeds of Concern for the Beaverhead-Deerlodge National Forest (December 2000). *Categories are based upon occurrence on the Forest, and are not the categories assigned by Montana.*

Scientific Name	*Common Name*	*Category*	*Dillon*	*Wise River*	*Wisdom*	*Butte*	*Madison*	*Jefferson*	*Pintler*
Carduus nutans	Musk thistle	1	x	x	x	x	x	x	x
Centaurea maculosa	Spotted knapweed	1	x	x	x	x	x	x	x
Cirsium arvense	Canada thistle	1	x	x	x	x	x	x	x
Cirsium vulgare	Bull thistle	1	x	x	x		x		
Cynoglossum officinale	Houndstongue	1	x	x	x	x	x	x	x
Euphorbia esula	Leafy spurge	1	x	x		x	x	x	x
Arctium minus	Burdock	2			x		x		
Asclepias speciosa	Showy milkweed	2							
Cardaria draba	Whitetop (hoary cress)	2			x		x	x	x
Carum carvi	Common caraway	2							x
Centaurea diffusa	Diffuse knapweed	2					x		x
Centaurea repens	Russian knapweed	2					x		
Chrysanthemum leucanthemum	Oxeye daisy	2		x	x	x			x
Convolvulus arvensis	Field bindweed	2			x				
Hieracium aurantiacum	Orange hawkweed	2			x			x	x
Hyoscyamus niger	Black henbane	2		x			x	x	x
Hypericum perforatum	St. Johnswort	2	x		x				
Knautia arvensis	Field scabious	2					x		
Linaria dalmatica	Dalmatian toadflax	2		x				x	
Linaria vulgaris	Yellow toadflax	2		x	x		x		x
Potentilla recta	Sulfur cinquefoil	2		x	x				x
Tanacetum vulgare	Common tansy	2			x		X	x	
Verbascum thapsus	Common mullein	2			x		X		x

*Note: "**x**" indicates presence of species on District based on current mapping. Category: **1** = 3rd Priority, Widespread Species, goal is containment within infested areas and reduction of plant populations. **2** = 2nd Priority, New Specie, goal is containment within already infested areas and strong emphasis on reduction of larger infestations and eradication of small isolated populations. **3** = 1st Priority, Potential Species, Currently absent from BDNF. Goal is prevention.*

Figure 3.5.1: Category 1: Example of a dense infestation (Field Scabious)

Figure 3.5.2: Category 2 infestation on steep terrain (Houndstongue)

Figure 3.5.3 Category 2 infestation typical of the BDNF (Spotted Knapweed)

Figure 3.5.4: Category 2 isolated infestation (Houndstongue)

Table 3.5.7: Acres of weed infestation on the Beaverhead-Deerlodge National Forest, by species and cover class *(sum of acres exceed total infested acres as multiple species may occur on same acre).*

Weed Species	*Acres by Canopy Cover*				*Total Acres*
	Trace	*Low*	*Moderate*	*High*	
Musk thistle	3646	281	522	0	4449
Spotted knapweed	14376	11767	5747	2219	34108
Canada thistle	5020	3172	296	6	8495
Bull thistle	3773	231	32	0	4036
Houndstongue	1931	37	361	0	2329
Leafy spurge	3077	567	602	1577	5823
Whitetop (hoary cress)	0	1469	0	26	1495
Oxeye daisy	757	2	17	0	775
Field bindweed	7	0	0	0	7
Orange hawkweed	0	45	0	0	45
Black henbane	75	0	0	0	75
St. Johnswort (goatweed)	127	0	0	1	128
Field scabious	136	84	18	0	238
Dalmatian toadflax	1502	199	0	0	1700
Yellow toadflax	12	13	24	0	49
Sulfur cinquefoil	5	229	1	0	235
Common tansy	728	117	0	0	845
Common mullein	320	575	5	0	900

Canopy Cover: Trace = <1% cover, Low = 1-5% cover, Moderate = 5-25% cover, High = >25% cover.

Table 3.5.8: Satellite Image Land Cover Classification Vegetation Communities of the BDNF (1995 satellite imagery).

General Cover	*SILC3 Community Type*	*Acres*	*Percent of Total*
Forest		**2,510,398**	**69.88%**
	Aspen	59,576	
	Douglas-fir	465,404	
	Juniper	953	
	Limber Pine	5,009	
	Lodgepole Pine	1,485,015	

General Cover	*SILC3 Community Type*	*Acres*	*Percent of Total*
(Forest cont.)	Mixed Broadleaf Forest	208	
	Mixed Conifer Forest	222,372	
	Ponderosa Pine	148	
	Recent Forest Fires	7,371	
	Subalpine Fir/Spruce	93,834	
	Whitebark Pine	170,508	
Non-Forest		**727,076**	**20.24%**
	Mesic Grass/Forb	197,168	
	Mesic Shrub	62,786	
	Non-Sagebrush Xeric Shrub	12,352	
	Sagebrush	315,731	
	Xeric Grass/Forb	139,039	
Non-Vegetated	**Rock/Barren Soil/Water**	**169,711**	**4.72%**
Development		**1,406**	**0.04%**
Unclassified	**Cloud, Shadow, Snow, etc.**	**183,809**	**5.12%**
TOTAL		**3,592,400**	**100.0%**

Table 3.5.9: Beaverhead-Deerlodge NF Rare Plant Species Occurrence by Ranger District *("x" = Population is known on the District. "s" = Species is suspected to occur on the District.)*

SCIENTIFIC NAME	*Dillon*	*Wise River*	*Wisdom*	*Butte*	*Madison*	*Jefferson*	*Pintler*
Agastache cusickii	x						
Antennaria densifolia		x					x
Arabis fecunda		x		x		x	
Astragalus scaphoides	x						
Balsamorhiza macrophylla					x		
Botrychium crenulatum							x
Botrychium hesperium							x
Botrychium paradoxum						x	x
Carex parryana ssp idahoa	x		x	x		x	
Castilleja covilleana		s	s				s
Castilleja gracillima					s		
Lesquerella paysonii		x					x

SCIENTIFIC NAME	Dillon	Wise River	Wisdom	Butte	Madison	Jefferson	Pintler
Lesquerella pulchella	x	x			x		
Penstemon lemhiensis	x	x	x	X		x	
Phlox kelseyi var missoulensis							x
Saussurea weberi							x
Saxifraga tempestiva	x	x				x	x
Adoxa moschatellina						x	
Allium acuminatum					x		
Allotropa virgata		x	x				x
Eleocharis rostellata					x		
Epipactis gigantea					x		x
Erigeron asperugineus	x						
Gentianopsis simplex			x				
Haplopappus macronema var. macronema	x	x					
Juncus hallii			x	X	x	x	
Mimulus primuloides	x	x	x				
Orogenia fusiformis					x		
Oxytropis podocarpa			s	S		s	s
Polygonum douglasii ssp austinae					x	x	
Potentilla quinquefolia					x	x	
Ranunculus jovis					x		
Salix wolfii var. wolfii					x		x
Scirpus cespitosus		x					
Thalictrum alpinum	x				x		x
Trifolium eriocephalum		s	s				s
Trifolium gymnocarpon		s	s				s
Veratrum californicum							x
Viola renifolia				X		x	

3.5.3 Fisheries

Affected Area: The Affected areas for fisheries are the nine sub-basins found on the Beaverhead-Deerlodge National Forest. They are the Upper Clark Fork, Flint Rock, Boulder, Jefferson, Madison, Big Hole, Red Rock, Beaverhead, and Ruby River Drainages. They drain east and west of the Continental Divide comprising portions of the headwaters of the Columbia and Missouri River systems. Sport fisheries are found in approximately 2100 miles of stream and 250 fish bearing lakes totaling over 7,000 acres. These, and other streams, lakes, potholes and marshes provide habitat for many non-game fish, vertebrate and invertebrate species.

The scope of analysis is the aquatic habitat within the affected area. Impacts to fish and other aquatic species are evaluated at the drainage 6th code Hydrologic Unit Level, HUC) and/or individual population levels. This analysis focuses on certain fish and amphibian species as representatives of aquatic communities to determine impacts.

Electro-fishing has been the primary means of fish sampling and population inventory. Species distribution and abundance across the Forest is defined at differing levels of detail for different species. Data is most complete for bull trout, westslope cutthroat and non-native trout populations. Where genetic composition is important for management decisions, samples have been collected and sent to the Wild Trout and Salmon Genetics Lab at the University of Montana.

Recent field efforts have begun to include amphibians and specific surveys for amphibians have been conducted. While our baseline data for amphibians is expanding, site specific, distributional data remains limited. In this analysis, distribution and occurrence is largely based on recent publications (Maxell 2000; Reichel and Flath 1995). Data collected by Forest personnel has been used to verify or adjust broad-scale distributional patterns reported for individual species.

Biological Condition: Approximately 23 fish species/subspecies are found on or immediately adjacent to the BDNF. These include native salmonids; westslope cutthroat trout, lake trout, bull trout, arctic grayling, and mountain whitefish. Other native fishes present are burbot, longnose sucker, mountain sucker, white sucker and largescale sucker, mottled sculpin, shorthead sculpin, slimy sculpin, longnose dace and redside shiner. Important non-native sport fisheries include brook trout, brown trout, rainbow trout, Yellowstone cutthroat, golden trout and kokanee.

Six species of amphibians are present. These include the tiger salamander, long-toed salamander, tailed frog, spotted frog and the western toad. The northern leopard frog may be present. Recent discoveries indicate the western chorus frog exists in the Beaverhead River drainage (Bryce Maxell personal communication). However, it has not been found on National Forest lands.
Five aquatic species on the Forest are given special consideration (Table 3.5.10). Fish species include bull trout, westslope cutthroat trout, and arctic grayling. Amphibian species include the western toad and northern leopard frog.

Table 3.5.10: Species of Special Consideration: Populations by Sub-basin Within the Affected Area

Drainage	*Species*	*Populations on National Forest*	*Populations on all ownerships*
Beaverhead	FAG	0	1
	WCT	12	19
	WT	Locally present	Locally present
	NLT	Possibly present	Possibly present
Boulder	WCT	6	6
	WT	Locally present	Locally present
	NLT	Possibly present	Possibly present
Flint-Rock	WCT	10	10
	WT	13	15
	NLT	Locally present	Locally present
Jefferson	WCT	3	3
	WT	Locally present	Locally present

Drainage	Species	Populations on National Forest	Populations on all ownerships
	NLT	Possibly present	Possibly present
Madison	FAG	0	1
	WCT	13	13
	WT	Locally present	Locally present
	NLT	Possibly present	Possibly present
Red Rock	WCT	30	54
	WT	Locally present	Locally present
Ruby	FAG	1	1
	WCT	17	18
	WT	Locally present	Locally present
Upper Clark Fork	BT	1	2
	WCT	28	33
	WT	Locally present	Locally present

(FAG=fluvial arctic grayling, WCT=westslope cutthroat trout, BT=bull trout, WT=western toad, NLF=northern leopard frog. westslope cutthroat are considered if 90% pure or greater).

Bull trout are listed as a threatened species under the Endangered Species Act. They only occur west of the Continental Divide in the Upper Clark Fork and Flint Rock sub-basins. The migratory life form common to bull trout is largely absent in the Upper Clark Fork above Milltown Dam. Existing populations are primarily limited resident fisheries, inhabiting tributary streams and a couple of small lakes.

A mixture of resident and migratory bull trout persist in the Rock Creek drainage. However they seem to persist at lower than preferred population levels. Lack of connectivity poses a major obstacle to bull trout conservation, especially in the upper Clark Fork. Small isolated populations maintain elevated risks to viability and effects from individual or cumulative impacts become magnified. Isolation has primarily occurred because of human activity such as development, dams, culverts, irrigation, placer mining, etc.

The Upper Clark Fork River is an Environmental Protection Agency (EPA) superfund site. Impacts to the river and many of its tributaries are associated with mining, impoundment and irrigation withdrawal. The Warm Springs Creek watershed is presumed to have historically provided a large portion of the spawning and rearing habitat for fluvial bull trout in the Upper Clark Fork River. Mining and smelting activities around Butte and Anaconda eliminated bull trout from the main river prior to 1900, isolating Warm Springs Creek from other tributaries in the system. Mining, timber harvest and development of a water supply system for the large-scale smelting operations in Anaconda further disrupted habitat conditions and fragmented the remaining population of bull trout in the watershed.

Sensitive species on the BDNF include westslope cutthroat trout (WCT), fluvial arctic grayling, northern leopard frog (possibly present) and western toad. Lake trout populations in two lakes on the Forest were recently determined by Montana Fish, Wildlife and Parks to be relict, native populations. Lake trout are being considered for sensitive species status on the Forest.

Westslope cutthroat trout are distributed broadly across the Forest, but persist primarily in short, isolated reaches of headwater streams. A 1997 analysis of populations east of the Continental divide

indicated genetically pure WCT are restricted to approximately 2% of their historic range. 89% of pure populations were found to have a high or very high risk of extinction. Primary causes for the decline in WCT are attributed to the introduction of non-native fishes, land management practices and over-fishing.

Occupied range for WCT west of the divide has also declined, although not as dramatically as in the Upper Missouri River Basin. Populations have maintained a greater degree of connectivity within drainages and occupy longer stream lengths. However, viability is still a concern for many populations. Individual WCT populations on both sides of the divide possess unique genetic characteristics, and the importance of conservation efforts at the population level should be emphasized.

In Montana fluvial (stream dwelling) arctic grayling were formerly widely distributed in the Missouri River and major tributaries upstream of Great Falls. In the mid to late 1980's the Big Hole River population declined significantly.

Since it represented the last remaining fluvial grayling population in the lower 48 States, a number of actions were initiated to insure the protection and restoration of the Big Hole population. In 1991, Montana Department of Fish, Wildlife and Parks signed a memorandum of understanding with the USFS, USFWS, BLM, the Montana Chapter of Trout Unlimited and the Montana Chapter of the American Fisheries Society, establishing the Big Hole Recovery Plan. This effort recently resulted in reintroduction of fluvial grayling into the Ruby River on the BDNF. Reintroduction efforts continue.

Past, Present and Reasonably Foreseeable Actions: Primary risks for aquatic species vary with different land management activities. Project design, mitigation and proper implementation are significant for land management actions; similarly important are intensity of an activity, and the duration of disturbance. Table 3.5.11 displays a list of actions that were common, occur today, and/or will likely occur in the future. These activities are considered in the cumulative impacts to aquatic species and habitat.

Table 3.5.11: Past, Present and Foreseeable Activities in the Affected Area Impacting Aquatic Habitat.

Activity	*Common type of habitat alteration or affects on aquatic species*
Livestock Grazing	Bank alteration, stream channel over-widening, sediment introduction
Placer mining	Bank alteration, sediment introduction, water withdraw
Hard rock mining	Sediment introduction, chemical changes in water quality
Timber harvesting	Sediment introduction, reduction of woody debris recruitment potential, water temperature increases
Road building and maintenance	Sediment introduction, barriers to fish movement
Recreation - non-fishing	Sediment introduction, non-biodegradable products introduced to the water
Recreation - Fishing	Injury due to mishandling of catch & released fish, and harvesting of fish
Irrigation diversions	Reduction of instream water flows
Dams	Altered water temperature regimes, deoxygenation of water, barrier to fish migration, Altered sediment transport capabilities; Altered invertebrate communities; sediment introduction during construction

Activity	Common type of habitat alteration or affects on aquatic species
Lake stocking	Competition and hybridization with native aquatic species
Noxious weed management	Chemical poisoning of fish and amphibians

Regulatory Framework: The following policy, law and Forest Plan direction are relevant to management of aquatic habitat and species on the Forest.

Forest Plan Goals

Contribute to the longevity of any threatened and endangered species by conducting management activities to prevent mortality (Deerlodge Forest Plan page II-1).

Maintain or restore water quality, to a degree that provides for stable and productive riparian and aquatic ecosystems; (Inland Native Fish Strategy – Amendment to the Deerlodge Forest Plan; Riparian Goal #1)

Maintain or restore stream channel integrity, channel processes, and the sediment regime (including the elements of timing, volume, and character of sediment input and transport) under which the riparian and aquatic systems developed (Inland Native Fish Strategy – Amendment to the Deerlodge Forest Plan; Riparian Goal #2.)

Recognize and promote the intrinsic ecological and economic value of the wildlife and fisheries resources on the Beaverhead National Forest.

Recognize the importance of the fishery resource, providing for the protection and/or enhancement of fisheries habitat in all project activities (Beaverhead Forest Plan page II-1)

Ensure a high degree of water quality and sufficient water quantity in on-Forest streams to protect fisheries habitat. (Beaverhead Forest Plan page II-1)

Forest Plan Objectives

Fisheries Habitat will be maintained and improved through emphasis on riparian zone restoration and management (Deerlodge Forest Plan page II-3).

The fisheries program recognizes the importance of Forest streams and lakes to both on-Forest and downstream fisheries. (Beaverhead Forest Plan page II-4).

Best Management Practices and Forest-wide Standards will be implemented in all management activities: and will be of particular significance whenever a management activity has the potential to produce adverse impacts to fishery resources. (Beaverhead Forest Plan page II-4).

Forest Plan Standards

Apply herbicides, pesticides, and other toxicants, and other chemicals in a manner that does not retard or prevent attainment of Riparian Management Objectives and avoids adverse effects on inland native fish (Inland Native Fish Strategy standard #RA-3, page A-12).

Provide clean water and habitat for fish by coordinating Forest Activities and by direct habitat improvement (Deerlodge Forest Plan, fisheries standard #3; page II-23).

Limit stream disturbing activities to times and/or methods, which minimize impacts on fish spawning areas, fish intra-gravel winter habitat, and aquatic insect production (Deerlodge Forest Plan, fisheries standard #5; page II-23).

Maintain instream fishery habitat for spawning, rearing and adult life stages (Beaverhead Forest Plan, fisheries standard # 2; page II-29)

All projects affecting or suspected of affecting the watershed resource will incorporate Best Management Practices into the project design and implementation… (Watershed Standard #1 Beaverhead Forest Plan page II-30).

Best Management Practices (BMPs) will continue to be developed and refined during the environmental analysis process. They will be incorporated into all land use and project plans as a principal mechanism for controlling non-point pollution sources as well as meeting soil and water quality or other resource goals (Beaverhead Forest Plan, Watershed standard #4 page II-30).

Laws

CFR 219.19: Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one that has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area.

Endangered Species Act of 1973(ESA): Section 7 of ESA prohibits a Federal Agency, in carrying out its own activities or issuing a permit or license to a private applicant, from "jeopardizing" the continued existence of an endangered or threatened species or destroying its critical habitat, and requires Federal Agencies to consult with one of the Federal Wildlife Agencies.

Section 9 of ESA makes it unlawful for any person to "take" a listed species, unless an exemption occurs through issuance of an incidental take permit from the United States Fish and Wildlife Service. Incidental take can only occur during the course of otherwise lawful activities and where such taking does not jeopardize the continued existence of the species or destroy or adversely modify critical habitat.

3.5.4 Water Quality

Affected Area: Nine sub-basins found on the Beaverhead-Deerlodge National Forests define the affected area for water quality analysis. They are the Upper Clark Fork, Flint Rock, Boulder, Jefferson, Madison, Big Hole, Red Rock, Beaverhead, and Ruby River Drainages

The waters of the BDNF drain both sides of the Continental Divide in southwest Montana. The entire Beaverhead National Forest and portion of the Deerlodge east of the Continental Divide contain headwaters streams of the Jefferson and Madison Rivers. These rivers make up two of the three forks of the Missouri River. Streams on the Deerlodge National Forest west of the Continental Divide are headwaters of the Clark Fork and Rock Creek basins of the Columbia River system.

Southwest Montana is characterized by the broad Madison, Deer Lodge, and Beaverhead Valleys surrounded by relatively isolated mountain ranges such as the Gravelly, Flint, and Pioneers. National Forest lands are generally located in the upper elevations of the mountain slopes, with the lower elevations and the broad valleys being predominately in private ownership. As a result, only the headwaters of small tributary streams lie on National Forest. The Big Hole, Beaverhead, Clark Fork, Boulder, Ruby and Jefferson Rivers flow primarily through private land.

Water quality related to stream chemistry on National Forest is generally good, and stream temperatures are low. Extensive water quality monitoring in the 1970's identified relatively few problems across the forest. Stream productivity is tied to the underlying geology, with watersheds containing granites and belt series rocks being less productive than those in limestone geologies.

Water uses on National Forest are predominately for cold-water salmonids, although there are also many water rights for livestock watering and mining on patented claims within Forest boundaries. Water uses downstream from National Forest include drinking water, swimming, irrigation, and domestic supplies. Many of the larger rivers in the area are designated as Blue Ribbon fisheries by the State of Montana. The Big Hole, Beaverhead, Rock Creek, Ruby, Madison Rivers are popular sport-fisheries.

Past Management: Mining operations had an adverse affect on water quality in some areas, especially on the Deerlodge portion of the Forest. A large portion of the upper Clark Fork basin is a Superfund site. Stream and riparian functions have been compromised in many streams by domestic livestock grazing. Extensive investigation of riparian areas in the 1990's found up to 50% of some stream types in a non-functioning or functioning-at-risk condition.

Sedimentation and turbidity are a concern in some streams as a result of road building, mining, livestock grazing and timber harvest. A number of smaller Forest streams are de-watered by irrigation removals from National Forest, or soon after they cross the Forest boundary. More site-specific information on the condition of Forest streams and habitat is available in various monitoring reports and other documents on file at the Supervisors Office in Dillon

Regulatory Framework: Section 313 of the Clean Water Act (CWA) requires Federal Agencies to comply with all substantive and procedural requirements related to water quality. Both the Environmental Protection Agency (EPA) and the States have the responsibility for carrying out this act. State water quality standards consist of:

- Designating a beneficial use for a body of water
- Establishing numeric or narrative criteria sufficient to protect the beneficial use.

Standards are established taking into consideration the use of the water body, its value for public water supply, propagation of fish and wildlife, recreational, agricultural, industrial, and other purposes. The Standards are the legal basis for control decisions under the CWA.

States are required under Section 303 (d) of the CWA to identify "waters within their boundaries for which effluent limitations are not stringent enough to implement any water quality standard applicable to such waters." These waters are designated, "water quality limited segments" (WQLS). WQLS streams on the BDNF are identified in Table 3.5.12.

Wetlands are protected under Executive Order 11990, which directs Federal Agencies to "minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the beneficial values of wetlands…" Effects on the maintenance of natural systems, flora, fauna, habitat diversity, and hydrologic utility are to be considered when evaluating a proposed project that could potentially affect a wetland.

In Montana, the Streamside Zone Management Act (HB 731) prohibits seven Forest practices in Streamside Management Zones. One of these is relevant to this proposal:

Handling, storage, application, or disposal of hazardous or toxic material in a manner that pollutes streams, lakes, or wetlands; or that may cause damage or injury to humans, lands, animals, or plants. The BDNFspill plan is attached in Appendix F.

Forest Plans for the Beaverhead NF (1986) and the Deerlodge National Forest (1987) contain standards that apply to activities that affect the watershed and fisheries resources. Although no standards speak directly to the application of herbicides, they direct us to maintain or improve water quality and fisheries. The intent of these standards is to prevent management activities from adversely affecting water and fish, generally through the application of Best Management Practices.

Table 3.5.12: Streams with Water Quality Limited Segments in the Affected Area Identified Under Section 303(d).

4th Code HUC	Stream Name	Impaired Uses	Probable Cause	Probable Source
Jefferson River	Big Pipestone	Aquatic Life Support Cold water Fishery	Nutrients, Siltation	Agriculture Channelization Flow Regulation Irrigated Cropland Natural Sources Pasture Land Resource Extraction Streambank Mod.
	Halfway	Cold Water Fishery	Habitat Alterations Siltation	Agriculture Rangeland
	Hells Canyon	Cold Water Fishery	Flow Alteration Habitat Alteration Siltation	Agriculture Flow regulation Irrigated Cropland Range Land Riparian Veg Removal Silviculture Streambank Mod.
	Little Pipestone	Aquatic Life Support Cold Water Fishery Drinking Water Supply	Habitat Alterations Siltation	Agriculture Natural Sources

4th Code HUC	Stream Name	Impaired Uses	Probable Cause	Probable Source
	South Boulder	Aquatic Life Support Cold Water Fishery Drinking Water Supply Swimmable Recreation	Flow Alteration Habitat Alteration Siltation Thermal mod. pH	Agriculture Flow Regulation Highway Irrigated Cropland Resource Extraction
	Fish	Aquatic life Support Cold Water Fishery	Flow Alteration Habitat Alteration Siltation	Agriculture Channelization Dredging Flow regulation Irrigated Cropland Resource Extraction
	Cherry	Cold water Fishery	Flow Alteration	Agriculture Flow Regulation Irrigated Cropland
	Dry Boulder	Aquatic Life Support Cold Water Fishery Drinking Water Supply Recreation	Flow Alteration Siltation	Agriculture Flow Regulation Irrigated Cropland Resource Extraction
	Whitetail	Aquatic Life Support Cold Water Fishery Swimmable	Flow Alteration Nutrients	Agriculture Dam Construction Flow Regulation Irrigated Cropland Resource Extraction
	South Willow	Cold Water Fishery Drinking Water Supply Industrial Use Recreation	Flow Alteration Metals Habitat Alteration Siltation	Agriculture Highway Irrigated Cropland Resource Extraction Range Land Streambank Mod.
Boulder River	Boulder River	Aquatic Life Support Cold Water Fishery	Flow Alteration Metals Nutrients Habitat Alterations Siltation Thermal Mod	Agriculture Irrigated Cropland Mill Tailings Resource Extraction Subsurface mining

4th Code HUC	Stream Name	Impaired Uses	Probable Cause	Probable Source
	Uncle Sam Gulch	Aquatic Life Support Cold Water Fishery Drinking Water Supply Recreation Swimmable	Metals Siltation pH	Resource Extraction Subsurface mining
	Cataract	Aquatic Life Support Cold Water Fishery Drinking Water Supply Recreation Swimmable	Metals Siltation pH	Agriculture Resource Extraction Rangeland Subsurface mining
	Basin	Aquatic Life Support Coldwater fishery	Metals Siltation	Placer Mining Resource Extraction Subsurface Mining
	Lowland	Aquatic Life Support Cold Water Fishery	Habitat Alterations	Dredge mining Resource Extraction Subsurface Mining
	Elkhorn	Aquatic Life Support Cold Water Fishery	Metals Habitat Alteration	Agriculture Highway Resource Extraction Rangeland Subsurface Mining
	Bison	Cold Water Fishery	Habitat Alteration	Agriculture Highway
	Little Boulder	Aquatic Life Support Cold Water Fishery	Flow Alteration Metals Habitat Alteration	Agriculture Highway Irrigated Cropland Placer Mining Resource Extraction Range Land
	Muskrat	Cold Water Fishery	Habitat Alteration	Agriculture Rangeland
	McCarthy	Cold Water Fishery	Habitat Alteration Siltation	Agriculture Resource Extraction Rangeland

4th Code HUC	Stream Name	Impaired Uses	Probable Cause	Probable Source
	Dry	Cold Water Fishery	Habitat Alteration Flow Alteration	Agriculture Irrigated Cropland Rangeland Silviculture
	Nursery	Aquatic Life Support Cold Water Fishery	Habitat Alteration	Agriculture Highway Rangeland
	Galena			
Flint/Rock	EF Rock	Cold Water Fishery	Siltation Thermal Mod	Agriculture Irrigated cropland Logging Road Pasture land
	WF Rock	Cold Water Fishery	Siltation	Agriculture Logging Road Resource Extraction
	Upper Willow	Cold Water Fishery Drinking Water	Flow Alteration Salinity Ammonia pH	Agriculture Irrigated cropland Rangeland
	Quartz	Aquatic Life Support Cold Water Fishery Recreation Swimmable	Flow Alteration Habitat Alteration Siltation	Placer Mining Resource Extraction
	Scotchman	Aquatic Life Support Cold Water Fishery	Siltation	Logging Road Natural Sources
	Flat	Aquatic Life Support Cold Water Fishery	Habitat Alteration Siltation	Agriculture Rangeland Silviculture
	Sawpit			
	Cornish Gulch	Cold Water Fishery	Suspended Solids	Resource Extraction
	Miners Gulch	Aquatic Life Support Cold Water Fishery Cultural/Ceremonial Swimmable	Flow Alteration Habitat Alteration Siltation Thermal Mod.	Agriculture Pasture Riparian Veg Removal

4th Code HUC	Stream Name	Impaired Uses	Probable Cause	Probable Source
	Douglas	Aquatic Life Support Cold Water fishery Drinking Water Supply Recreation Swimmable	Metals Siltation Suspended Solids	Mill tailings Mine Tailings Resource Extraction
	NF Douglas	Aquatic Life Support Cold Water Fishery Drinking Water Recreation Swimmable	Suspended Solids Metals Siltation	Mine Tailings Resource Extraction
	Fred Burr	Aquatic Life Support Cold Water Fishery	Metals Siltation	Mill Tailings Resource Extraction Subsurface Mining
	SF Lower Willow	Aquatic Life Support Cold Water Fishery	Metals Suspended Solids	Resource Extraction
	Boulder	Aquatic Life Support Cold Water Fishery	Habitat Alteration	Placer Mining Resource Extraction
	Stewart	Aquatic Life Support Cold Water Fishery Cultural/Ceremonial Swimmable	Flow Alteration Habitat Alteration Siltation Suspended Solids	Agriculture Pasture Riparian Veg Removal
	Princeton	Aquatic Life Support Cold Water Fishery	Siltation Suspended Solids	Placer Mining Resource Extraction
	Smart Ck	Aquatic Life Support Cold Water Fishery Cultural/Ceremonial Swimmable	Flow Alteration Habitat Alteration Siltation Thermal mod	Agriculture Pasture Riparian Veg Removal
	Harvey	Aquatic Life Support Cold Water Fishery	Flow Alteration Organics Habitat Alteration Siltation	Agriculture Dam Construction Irrigated cropland Placer Mining Resource Extraction Range land Subsurface Mining

4th Code HUC	Stream Name	Impaired Uses	Probable Cause	Probable Source
Upper Clark Fork	Upper Clark Fork River	Aquatic Life Support Cold Water Fishery Recreation Swimmable	Flow Alteration Metals Noxious Aquatic Plants Nutrients Organics Habitat Alterations Suspended Solids	Agriculture Channelization Irrigated cropland Municipal Mill Tailings Mine Tailings Resource extraction
	Twin Lakes	Cold Water Fishery	Flow Alteration	Agriculture Hydromodification Irrigated cropland
	Cable	Aquatic Life Support Cold Water Fishery	Metals Nutrients Habitat Alterations Siltation	Agriculture Mine Tailings Resource Extraction Range land Silviculture
	Storm Lake	Aquatic Life Support Cold Water Fishery	Flow Alteration Habitat Alteration	Channelization Resource extraction
	Peterson	Aquatic Life Support Cold Water Fishery	Flow Alteration Siltation	Agriculture Harvesting Irrigated cropland Logging Road
	Dunkleberg Ck.	Aquatic Life Support Cold Water Fishery	Flow Alteration Metals Nutrients Siltation	Agriculture Mine Tailings Crop Production Resource Extraction
	Gold	Aquatic Life Support Cold Water Fishery Recreation	Flow Alteration Nutrients Habitat alterations Siltation	Agriculture Harvesting Irrigated cropland Pasture Placer Mining Resource Extraction

4th Code HUC	Stream Name	Impaired Uses	Probable Cause	Probable Source
Big Hole River	Camp	Aquatic Life Support Cold Water Fishery Drinking Water Industrial Recreation Swimmable	Flow Alteration Habitat Alteration	Agriculture Irrigated Cropland Placer Mining Resource Extraction Range Land Streambank Mod.
	Moose	Aquatic Life Support Cold Water Fishery Drinking Water Recreation	Flow Alteration Habitat Alteration Siltation	Agriculture Flow Modification Highway Irrigated cropland Resource Extraction Range Land Streambank Mod
	Charcoal	Aquatic Life Support Cold Water Fishery	Siltation	Highway
	Trapper	Aquatic Life Support Cold Water Fishery Drinking Industrial Recreation	Flow Alteration Metals Habitat Alteration	Agriculture Highway Irrigated cropland Mine tailings Resource extraction Range Land Surface mining
	Canyon	Cold Water Fishery	Flow Alteration Metals Habitat Alteration Siltation	Agriculture Flow Regulation Highway Rangeland Riparian Veg Removal Streambank Mod.
	Birch	Aquatic Life support	Flow Alteration	Agriculture

4th Code HUC	Stream Name	Impaired Uses	Probable Cause	Probable Source
		Cold Water Fishery Drinking Water Industrial Recreation Swimmable	Metals Habitat Alteration Siltation	Flow Modification Irrigated cropland Resource Extraction Streambank modification Impoundment
	Willow	Aquatic Life Support Cold Water Fishery Drinking Water Swimmable	Flow Alteration Habitat Alteration Siltation	Agriculture Irrigated cropland Range land
	Pintler	Aquatic Life Support Cold water Fishery Drinking Water Supply Recreation Swimmable	Flow Alteration	Agriculture Dam Construction Flow Modification Hydromodification Irrigated cropland
	Wise River	Aquatic Life Support Cold Water Fishery	Siltation	Agriculture
	Mussigbrod	Aquatic Life Support Cold Water Fishery Recreation Drinking Water Swimmable	Flow Alteration Habitat Alteration Siltation	Agriculture Flow Modification Irrigated cropland Rangeland
	Johnson	Aquatic Life Support Cold Water Fishery Drinking Water Recreation Swimmable	Flow Alteration Habitat Alteration Siltation	Agriculture Irrigated cropland Natural Sources Rangeland Silviculture
	Trail	Aquatic Life Support Cold Water Fishery	Habitat Alteration Siltation	Agriculture Hydromodification Rangeland

4th Code HUC	Stream Name	Impaired Uses	Probable Cause	Probable Source
				Silviculture Streambank Mod. Highway Channelization
	Ruby	Aquatic Life Support Cold Water Fisheries Drinking water Recreation Swimmable	Flow Alteration	Agriculture Flow modification Hydromodification Irrigated cropland
	Swamp	Aquatic Life Support Cold Water Fishery Drinking Water Supply Industrial Recreation Swimmable	Flow Alteration Habitat Alteration Siltation	Agriculture Irrigated cropland Rangeland Riparian Veg Removal Streambank Mod.
	Governor	Aquatic Life Support Cold Water Fishery Drinking Water Industrial Recreation Swimmable	Flow Alteration Habitat Alteration Siltation	Agriculture Irrigated cropland Range land Riparian Veg Removal Streambank Mod
	Warm Springs	Aquatic Life Support Cold Water Fishery Industrial Recreation Swimmable	Flow Alteration Habitat Alteration	Agriculture Irrigated cropland Rangeland
Beaverhead River	Grasshopper	Aquatic Life Support Cold Water Fishery Drinking Water Recreation	Flow Alteration Metals Habitat Alteration Siltation	Agriculture Flow Modification Mine Tailings Natural Sources

4th Code HUC	Stream Name	Impaired Uses	Probable Cause	Probable Source
		Swimmable		Resource Extraction Rangeland Surface mining
Ruby River	Mill	Aquatic Life Support Cold Water Fishery Drinking water Recreation	Flow Alteration Siltation Thermal mod	Agriculture Channelization Flow Regulation Highway Resource Extraction
	Ramshorn	Aquatic Life Support Cold Water Fishery Drinking water	Metals	Resource Extraction
Madison River	WF Madison River	Aquatic Life Support Cold Water Fishery	Siltation	Natural Sources Rangeland
	North Meadow	Aquatic Life Support Cold Water Fishery	Flow Alteration Metals Siltation	Agriculture Irrigated Cropland Resource extraction Silviculture
	South Meadow	Cold Water Fishery	Metals Habitat Alteration	Agriculture Septic Systems Resource Extraction

3.5.5 Wildlife

Affected Area: The affected area to determine wildlife (including Threatened, Endangered and Sensitive Species) existing condition and effects includes the entire Beaverhead-Deerlodge National Forest, adjacent Bureau of Land Management, State and private lands. This area contains the home range of wildlife/TES and their habitats that may be affected by the proposal and alternatives.

Data Collection and Analysis: Wildlife information was gathered using existing wildlife use maps on the Forest, information from the various Landscape Analyses, Montana Fish, Wildlife and Parks biologists, BLM biologists ad ongoing field surveys conducted in the analysis area.

Past Activities: Activities that shaped the existing habitat situation are timber harvest, livestock grazing, mining, roads and trails. Recreational activity (big game hunting, off-highway vehicle use, hiking, etc.) and access management also influence habitat security. The Southwest Montana Interagency Visitor Travel Map defines travel restrictions in the affected area. Guard stations and

developed campgrounds are located throughout the affected area (shown on the Visitor/Travel Maps). Dispersed recreation sites occur throughout the Forest.

Timber sales and road construction have occurred in the past few decades within the affected area. Timber sales were located mostly in lodgepole pine. More recently, areas of dead, insect-killed lodgepole stands have been entered, as well as, Douglas fir and aspen. Since 1970, timber has been harvested on 60-65,000 acres (less than 2% of the affected National Forest). An additional 18-19,000 acres of post and poles products have been removed from dense lodgepole pine stands, mostly in the form of thinning.

About 6,500 miles of roads and 2,900 miles of trails built (or rebuilt) on the Forest.

Livestock grazing began on the Forest in the late 1800's. There are currently 257 active grazing allotments (246 cattle and horse, 10 sheep and goat, and 1 bison) in the affected area. The number of allotments, size of allotments and livestock forage use has been on a general decline since the 1940's.

Mining occurred on the Forest since the mid-1800s. There are currently 1,302 active mining operations on the Forest. The majority of the mining activity is located on the Jefferson Ranger District in the Boulder/Basin area and on the Pintler Ranger District.

Present Activities: Livestock graze within the affected area on 257 active National Forest allotments. Vegetation monitoring demonstrates that allotments are in good general condition, however, specific riparian areas are not properly functioning. Uplands are generally in good condition. Grazing also occurs on adjacent State, BLM and private lands.

Noxious weed treatment occurs on approximately 6,500-7,000 acres within the Forest. Most activity is located near roads, motorized trails, campgrounds and administrative sites.

Mining activity in the area is sporadic and depends upon the current market value of minerals. Current levels of activity are occurring at a slow steady rate. Most activity is located on the Jefferson and Pintler Ranger Districts.

Timber harvest occurs on the Madison (West Fork Madison/Standard Creek areas), Wisdom (Steel, Saginaw, Dry & Ruby Creek areas), Wise River (La Marche, Alder & Bryant Creek areas) and Pintler (South Boulder/Wyman Gulch, Coal Gulch and Montana State Prison areas) Ranger Districts.

Montana Department of Natural Resources and Conservation (DNRC) has sales in or planned for the following areas: Blacktail Creek, Moore Gulch, Browns Gulch, Long Creek, Cottonwood Creek and Silver King Ridge. BLM has sales in or planned in the following areas: Lemhi Pass, Dice Creek, Badger Pass and Mussigbrod Creek. Post and pole harvest occurs at various locations on the Forest, BLM and State. Firewood gathering also takes place throughout the area.

Recreational use depends on the time of year. In general, recreational activity is moderate on the Forest. The Forest receives heavy use by hunters during the general rifle season. Open motorized routes vary depending on the time of year because of seasonal motorized vehicle access restrictions (see the above mentioned Visitor/Travel Maps).

Reasonably Foreseeable Activities: A complete list of foreseeable activities can be found in the List of Beaverhead-Deerlodge National Forest Ongoing Projects (2002), with NLAA (Not Likely to Adversely Affect) Determinations (USDA, 2002), the current BDNF NEPA quarterly report, and the current BLM NEPA project list (see Project File). Subdivision development and house building in many areas adjacent to the National Forest is anticipated to continue. Patented mining claim areas may be developed, but at the very low level as in the previous decade.

Current Resource Status: Weed infestations currently affect less than 1.3% of affected National Forest. As a result, few wildlife habitats are being measurably impacted. The resource status of by Management Indicator Species ("MIS" as listed in the 1986 Beaverhead National Forest Plan, 1987 Deerlodge National Forest Plan and species of concern associated with this particular proposal) is described, below:

Grizzly Bear (Threatened Species) – The majority of the affected area is located outside of the Yellowstone Recovery Area as outlined in the 1993 Grizzly Bear Recovery Plan. A portion of the Lee Metcalf Wilderness on the Madison Ranger District is located within the Recovery Area and designated as Management Situation 2. The USFWS considers grizzlies to be resident and transient in the South Zone East of I-15 (Madison Ranger District) and North Zone of the BDNF (letter dated December 14, 1998). The Madison and Gravelly Mountain Ranges on the Madison Ranger District are the areas with the most recent confirmed grizzly activity. Isolated areas, whitebark pine stands, elk calving areas and avalanche chutes are likely places of grizzly activity. Weed infestations currently have little impact on grizzly habitats. Grizzly bear population trends for the Greater Yellowstone Ecosystem are increasing and expanding.

Peregrine Falcon (Endangered Species) – Peregrine falcon activity occurs at scattered locations across the Forest. Nests are located in and around the Centennial Valley with historic nest sites located near the Big Hole River and a hack site on Sheepshead Mountain. Peregrine habitat, (large cliff structure), is generally lacking throughout the affected area. Peregrines may be observed throughout the Forest due to the scattered nest locations. Weed infestations are having little impact on peregrine nesting habitat and only minor impact on forage in riparian areas. Peregrine falcon population trends for the United States are increasing and expanding. This trend led to the proposed delisting of peregrine falcons, August 25, 1999.

Bald Eagle (Threatened Species) – Bald eagle activity occurs at scattered locations across the Forest. Nests are located along the Madison River, and within the Centennial, Ruby, Beaverhead and Big Hole Valleys. Eagles winter in the Madison, Ruby, Beaverhead, Big Hole and Deer Lodge Valleys. Bald eagles may be observed throughout the Forest due to the scattered nest locations and wintering activities throughout the analysis area. Weed infestations are having little impact on nesting, foraging or wintering habitat for bald eagles. Bald eagle population trends for the United States are increasing and expanding. This trend has led to proposals to remove bald eagles from the threatened list, July 6, 1999.

Canada Lynx (Threatened Species) – Lynx habitat in the western mountains consists primarily of two structurally different forest types occurring at opposite ends of the stand age gradient. Lynx require early successional forests that contain high numbers of prey (especially snowshoe hares) for foraging and late-successional forests that contain cover for kittens (especially deadfall) and for denning. Intermediate successional stages may serve as travel cover for lynx, but function primarily to provide connectivity within a forest landscape. Although such habitats are not required by lynx, they "fill in the

gaps" between foraging and denning habitat within a landscape mosaic of forest successional stages (Ruggiero *et al.*, 1994). Most lynx activity within the affected area is located in the Pioneer Mountains and near Georgetown Lake. Weed infestations are not as prevalent in forested habitats, and are currently having little impact on lynx habitat.

Gray Wolf (Endangered and nonessential experimental species) – The affected area occurs in three different management areas for wolves. The area located east of I-15 and south of I-90 is part of the Yellowstone nonessential experimental area; the area west of I-15 and south of I-90 is part of the Central Idaho nonessential experimental area; and in the remaining area west of I-15 and north of I-90 wolves are endangered. There are two (Boulder, Wall Creek) known packs and two suspected (Fleecer, Wolf Creek) located within the analysis area. Wolves are reported on all areas of the Forest.

Wolf/human interactions and an adequate prey base are primary factors that would influence wolf use of the analysis area. Weed infestations are having little impact on wolf habitat, but are having a larger impact on winter ranges used by elk and deer. Both of these species are prey for wolves. Management of wolves within this area, as well as the entire nonessential area, is not expected to impact current and proposed land use within the Beaverhead-Deerlodge National Forest, nor are current and proposed land uses expected to impact wolf management (USDI Fish and Wildlife Service 1994). Gray wolf population trends within and near the analysis area are increasing and expanding.

Elk (MIS-big game species) – Elk are found throughout the analysis area. The wintering elk population within the analysis area is approximately 40,000 animals with an increasing trend for the past decade. Overall population objectives as outlined in the Elk Plan – MDFWP (Youmans, 1992) are generally being met or exceeded for the involved Elk Management Units.

Summer range for elk within the analysis area is located in the upper elevations, usually at the heads of drainages and adjacent timbered areas. Elk can be found, however, summering throughout the affected area. Summer range areas have not been a concern. Weed infestations are currently having little impact on summering areas.

Calving occurs throughout the analysis area from mid-May to Mid-June as elk follow the receding snowline up to summering areas. Weed infestations are having little impact on calving areas.

Winter range is located in the lower elevation areas adjacent to the National Forest boundary. The majority of elk winter on State Wildlife Management Areas, (Wall Creek, Bear Creek, Blacktail, Robb-Ledford, Fleecer Mountain, Mount Haggin) BLM, DNRC and private land at lower elevations. Only a few elk winter on the BDNF. Winter forage appears to be adequate for those few wintering elk. Weed infestations are beginning to have an impact on forage availability in limited areas on these winter ranges.

Sage Grouse (MIS-sagebrush communities, Sensitive Species) – Sage grouse, due to their dependence upon sagebrush-grassland habitat for food and cover, are limited in distribution to the range type dominated by sagebrush, principally big sagebrush (*Artemisia tridentata*), but also its related species (Klebenow, 1972). Population trend for sage grouse in southwestern Montana has been slowly downward for the past decade (Crowely & Connelly, 1996). This is due to a combination of factors including, but not limited to loss of winter range, degradation of habitat and conversion of sagebrush habitat to agricultural use. Weed infestations are having the most impact on the sagebrush habitat that sage grouse use.

Pine Marten (MIS-old growth spruce-fir) – In general, American martens are found in old-growth coniferous forests. These forests tend to have a complex understory and "the preference and apparent need for structure near the ground …appears to be universal" (Ruggiero *et al.*, 1994). According to Fager (1991, cited by Ruggiero *et al*, 1994), lodgepole pine is the preferred tree species for American marten in the arid, cold areas of the northern Rocky Mountains. This was confirmed on the east side of the Pioneer Mountains (Gorshkov *et al.*, 1998). In general, they avoid open areas (Fager, 1991). Weed infestations are having little impact on habitat used by pine marten. Population trend for pine marten within the analysis area is unknown.

Goshawk (MIS-old growth Douglas-fir, Sensitive Species) – There are at least 40 territories located on the Forest portion of the analysis area. The nest sites are located in Douglas-fir/lodgepole pine covered slopes. Others have observed these same nest site characteristics in various studies in the general area of southwest Montana (Armiger & Sterling, 1998; Gannon & Brooks, 1998; Patla, 1997). Goshawk foraging occurs in similar areas of Douglas fir and lodgepole pine. Goshawks may be observed flying throughout the analysis area between foraging areas. Weed infestations are having little impact on goshawk habitat. Population trend for goshawks is unknown.

Trumpeter Swan (MIS-marshland communities, Sensitive Species) – Trumpeter swan habitat is typically open boreal forest, preferring large shallow, fertile marshes or lakes (up to four feet deep) with a profusion of submerged and emergent aquatic plants and generally non-timbered, well-vegetated shorelines. During winter, trumpeter swans prefer shallow lakes, streams and ponds with open water that are bordered by some level and open terrain (DeGraaf *et al.*, 1991). Trumpeters nest at Elk and Conklin Lakes on the Madison Ranger District, and nearby Red Rocks Lake National Wildlife Refuge. They winter at the Refuge, Wade Lake, Ennis Lake and O'Dell Creek. Weed infestations are having a minor impact on trumpeter habitat. The population trend for the Rocky Mountain population has been increasing since 1971 (Gomez, 1999).

Hairy Woodpecker (MIS-lodgepole pine) – Inhabit nearly all types of forest within its range, preferring bottomlands with large mature trees. They are generally more abundant at the edge of woodlands. These woodpeckers excavate cavities in snags or in live trees with decaying heartwood. Usually chooses deciduous trees such as aspens, ashes, elms or cottonwoods. Weed infestations are having very little impact on hairy woodpecker habitat. Hairy woodpeckers have a stable population throughout most of their range (DeGraaf *et al.*, 1991).

Mountain Vole (MIS-mountain grassland) – The Montane vole is a common species found in dry grasslands of western and central Montana. It also occurs at higher altitudes, and in grassy alpine tundra, in the absence of the meadow vole, it lives in wet sedge-grass meadows, and shares riparian willows with the water vole. It has been found in sage grass, willow-grass-sedge savannah, grass-sedge meadow, Timothy meadow, grass-forb meadow, aspen consocies, alder willow swamp and alpine meadow habitats. However, it is less tolerant of extremely dry or wet habitats such as sage and willow-grass-sedge savannah (USDA Forest Service, 1995a). Weed infestations are having minor impact on mountain vole habitat. The population trend for mountain voles is unknown, however, trapping efforts have found them very common in Montana above 5,000 feet elevation (Douglass, 2000).

Sage Thrasher (MIS-evergreen shrub) – Mainly limited to semiarid sagebrush plains, but may extend into junipers and mountain mahogany habitats near sagebrush. Sometimes nests on the ground under

sagebrush, but usually in branches near the main stem of sagebrush plants, 1 to 3 feet above ground. May also nest in other low growing shrubs such as greasewood, horsebrush, rabbitbrush and saltbrush. Gleans food from the ground, including great numbers of grasshoppers, Morman crickets and other insects. Also, eats fruits and berries in the fall. Weed infestations are having the most impact on the types of habitat that sage thrashers use. Sage thrashers are common throughout most of their range (DeGraaf *et al.*, 1991).

Belted Kingfisher (MIS-riparian shrub) – Occur in the vicinity of ponds, lakes, rivers and streams, even rocky seacoasts near areas of exposed vertical ground such as bluffs, road cuts, gravel pits or sandbanks. Prefers small, clear bodies of water to large lakes. In winter frequents ice-free waters that allow access to food. Typically excavates a nest burrow 3 to 6 feet, up to 15 feet, deep in a bank with sandy, gravelly or clay soil. Constructs burrow at least 5 feet above level ground or water and usually within 3 feet of the top of a bank. Occasionally locates burrow far from water and at times may have to forage up to 5 miles from the nest site. Builds a nest cavity that is an enlarged area at the end of the burrow, often lined with disgorged food pellets. Feeds primarily on fish averaging 3 to 4 inches, caught by diving into water. Forages from a perch or while hovering over water. Also may eat crayfish, mollusks, frogs, tadpoles, lizards, newts, mice, large insects and occasionally fleshy fruits. Weed infestations are having minor impact on habitat used by belted kingfisher. They are very common (DeGraaf *et al.*, 1991).

Willow Flycatcher (MIS-riparian shrub) – Occur in a variety of habitats ranging from brushy fields to willows, thickets along streams, prairie woodlots, shrubby swales and open woodland edges. Prefers edge habitats that include thickets or groves of small trees and shrubs surrounded by grasslands, as well as, the edges of gallery forests along rivers or streams. In areas where its range overlaps that of the alder flycatcher, prefers drier, smaller, more open shrubby habitat. Nests usually in horizontal forks or upright crotches of shrubs or small trees, usually between 3 to 25 feet above ground, averaging 4 to 6 feet. Commonly nests in dogwood, hawthorn, willow, buttonbush, elder, viburnum and blackberry. Places nest at the outer edge of a shrub or thicket, so it can be easily approached. It eats flying insects. Weed infestations are having minor impact on willow flycatcher habitat. They are common with a population that is generally stable or increasing throughout its range (DeGraaf *et al.*, 1991).

Northern Water Shrew (MIS-riparian tree) – Uses small, cold streams with dense riparian vegetation (Thompson, 1982 cited in Final EIS Beaverhead Forest Plan Riparian Amendment, 1997). One study found this species in riparian vegetation of mature or old growth forest (Anthony *et al.*, 1987 cited in Final EIS Beaverhead Forest Plan Riparian Amendment, 1997), but it also uses marshes, willow/alder and grass/sedge communities. This species is insectivorous and concentrates feeding in or along water's edge. Weed infestations are having minor impact on water shrew habitat. Population trend is unknown.

Warbling Vireo (MIS-riparian tree) – Inhabits open deciduous and mixed deciduous-coniferous forests, especially streamside vegetation, but also in groves, scrubby hillside trees and residential areas. In mixed forests, generally associated with the deciduous trees and prefers forests with a substantial forb or shrub layer and low to intermediate canopy cover. Builds a cup nest that is usually suspended from a horizontal branch of a deciduous tree, often popular or aspen, generally in branches well away from the tree trunk and higher than those of other vireos. Gleans much of its food from the mid to upper canopy of deciduous trees. Eats mostly animal matter but includes some small fruits. Weed infestations

are having minor impact on warbling vireo habitat. They are common and widespread (DeGraaf *et al.*, 1991).

Western Jumping Mouse (MIS-wet meadow) – Inhabits areas near streams with lush growths of grasses and forbs, with or without a shrub or tree overstory (tall grasses for overhead cover). It hibernates, emerging in April to May. Jumping mice are nocturnal and feed on seeds, insects and fruits (Burt & Grossenheider, 1980 cited in Final EIS Beaverhead Forest Plan Riparian Amendment, 1997). Weed infestations are having a minor impact on western jumping mouse habitat. Population trend is unknown.

Blue-winged Teal (MIS-marshland) – Prefers wetlands on rolling tallgrass prairie but is also found in mixed shortgrass prairie and boreal and deciduous forests. A shoreline inhabitant more than an open water bird, it prefers calm water or sluggish currents to fast water. Uses rocks protruding above water, muskrat houses, trunks or limbs of fallen trees, or bare stretches of shoreline or mudflats as resting sites. Winters on shallow inland freshwater marshes and on brackish and saltwater marshes. Builds nests on dry ground in dense grassy sites such as bluegrass, hayfields and sedge meadows, where the vegetation ranges from 8 to 24 inches high at onset of nesting, or under bushes, usually within several hundred yards of open water; occasionally on a sedge tussock or muskrat house, in slough grass, or in alfalfa fields. In good habitat, it nests communally. Prefers to feed on mud flats, in fields or in shallow water where there is floating and shallowly submerged vegetation plus abundant small aquatic animal life. Consumes a diet that is 70 percent vegetative, consisting of seeds of sedges; grasses, pondweeds, and smartweeds; stems and leaves of aquatic plants; and snails, mollusks, crustaceans and insects. Weed infestations are having minor impact on blue-wing teal habitat. They are common throughout their range (DeGraaf *et al.*, 1991).

Northern Three-toed Woodpecker (MIS-old growth) – Primarily inhabits coniferous forests of the West, especially where fires have left large stands of dead trees. Also occasionally inhabits conifer stands in the Northeast. Excavates nest cavities each year in dead trees or in dead limbs with decayed heartwood in live trees. Usually locates nest holes 5 to 12 feet above ground in pine, aspen, spruce and cedar. It feeds by probing and drilling for wood-boring larvae of moths and beetles. In Colorado, consumes spruce beetles for 65 percent of its winter diet. Also eats ants, wood-boring larvae, caterpillars, fruits, mast and cambium. Weed infestations are having little impact on northern three-toed woodpecker habitat. They are locally common in the western coniferous forests (DeGraaf *et al.*, 1991).

Piliated Woodpecker (MIS-old growth) – Generally limited to mature coniferous, deciduous and mixed forests with large, dead trees. Prefers woodlands near water. Usually excavates nest holes in dead tree trunks or dead limbs of living trees. Generally requires trees greater than 15 inches in diameter at breast height (dbh) for nest and roost cavities and generally uses ponderosa pine snags greater than 20 inches dbh. Nests in a variety of tree species, including beech, cottonwood, yellow-poplar, birch, oak, hickory, maple, hemlock, pine, ash, elm, basswood and aspen. Consumes a diet that is about 70 percent insects, with ants, especially carpenter ants and wood-boring beetles, predominating. Also consumes other insects, some wild fruits, mast and seeds of sumac. Weed infestations are having little impact on pileated woodpecker habitat. Locally common, but has become less common in areas where extensive agriculture or logging practices have eliminated large tracts of old-growth forests (DeGraaf *et al.*, 1991).

In addition to the Sensitive species listed previously, are the following Sensitive species as listed in Update of Northern Region Sensitive Species List (March 12, 1999): pygmy rabbit, wolverine, fisher, northern bog lemming, Townsend big-eared bat, common loon, Harlequin duck, flammulated owl, burrowing owl, black-backed wood pecker and Columbian sharp-tailed grouse. Only the pygmy rabbit and Columbian sharp-tailed grouse occur in the sagebrush/grassland habitat that is being most affected by noxious weed invasion (see Biological Assessment for a complete discussion of TES Species).

Pygmy Rabbit (Sensitive Species) – Pygmy rabbits are dependent upon sagebrush, primarily big sagebrush (*Artemisia tridentata*), and are usually found in areas where big sagebrush grows in very dense stands. Tall, dense sagebrush clumps are essential (Orr, 1940 cited in McAllister, 1995). The preferred habitat in Montana appears to be gently sloping or level floodplains where adequate sagebrush and appropriate soils exist. However, many occupied sites have marginal sagebrush cover and shallow soils. These areas are generally associated with patches of tall, dense sagebrush and adequate soils. Areas of marginal sagebrush cover or stringers of sagebrush have been identified as important habitat features that allow movement into suitable habitat (Rauscher, 1997). The Horse Prairie region and Badger Gulch may be a stronghold for the species in the State (Rauscher, 1997). Weed infestations are having the most impact on the type of habitat that pygmy rabbits use. It is unclear if the population has remained stable or has varied since first reported in Montana.

Columbian Sharp-tailed Grouse (Sensitive Species) – Columbian sharp-tailed grouse are a chicken like bird, the smallest of the seven subspecies of sharp-tailed grouse. They have darker gray plumage; more pronounced spotting on the throat and narrower markings on the underside than other subspecies of grouse. Historically, these grouse were found west of the Continental Divide in Montana. The Beaverhead-Deerlodge National Forest has no records of Columbian sharp-tailed grouse on the forest. Excessive hunting in mid-to-late 19th century is believed to be the major contributing factor to early extirpation of local populations and the initial reduction of the grouse's range. Conversion to agriculture of the grouse's preferred shrub-steppe, grassland and riparian habitat may have contributed to local population declines, along with habitat degradation caused by heavy livestock grazing.

They inhabit mid to tall grasslands interspersed with scattered woodlands, arid sagebrush, brushy hills and edges of riparian woodland. They prefer habitats with several small openings, 1 to 10 acres in size, close together or a single large opening of 50 to 100 acres. Weed infestations are having an impact on the types of habitat that Columbian sharp-tailed grouse use. A status review by the USFWS determined that some of the smaller, isolated populations are currently at risk of extinction, but there are numerous larger populations of the species that are relatively secure and possibly increasing.

Regulatory Framework: The NFMA regulations are outlined in 36 CFR 219.19 and 219.27 for the Fish and Wildlife resource. Regulations focus on the use of Management Indicator Species for the evaluation of effects on habitat needed to maintain these species. These regulations also direct that measures shall be prescribed that prevent the destruction or adverse modification of habitat determined to be critical for threatened and endangered species; and preserve and enhance the diversity of plant and animal communities so that it is at least as great as that which can be expected in the natural forest.

The Endangered Species Act of 1973 (section 7) States "All Federal Agencies are required to undertake programs for the conservation of endangered and threatened species and are prohibited

(amended 1978) from authorizing, funding or carrying out any action that would jeopardize a listed species or destroy its 'critical habitat'".

3.5.6 Soil Resources

Affected Area: Affected areas for the analysis of impacts of proposed actions on soil quality are weed-infested sites. Noxious weeds currently occur on approximately 43,000 acres on the Beaverhead-Deerlodge National Forest. (Map and data tables are located in the project file).

Noxious weeds occur on most combinations of landforms, geology and soil in the foothills to midmontane elevation zones. However, knapweed typically occurs in foothills to lower montane positions in pluvial (slope wash highly dissected landform), and on lower montane and foothills moraine and outwash. Soils on these land types are highly variable in particle size class distribution but usually contain 15 to 35 percent coarse fragments. (Beaverhead-Deerlodge South Zone Soil Survey, in progress, available in the electronic project file at the Supervisor's Office in Dillon, MT)

Existing Condition: The effect of weed infestations on soil quality varies with the community type, species, soil, and ecological setting. Aggressive noxious weeds like knapweed generally outcompete native vegetation and ultimately dominate the site. Soil cover, biomass production, and accumulations of organic matter drop drastically when weeds dominate a site. Erosion rates increase somewhat, soil biochemical processes and soil organism habitat are altered, and soil quality and productivity eventually declines (Willard, et. al 1988).

Most of the weed infestations on the south half of the Forest are relatively light, and do not yet dominate other vegetation except for some heavy stands of Canada and musk thistle. Alternatively, on the north half of the Forest large, dominant stands of knapweed are common. The loss of native communities on these sites and the associated degradation of soil quality have likely caused reduced biodiversity and ecosystem function, led by declines in biomass and forage production similar to that reported by Stalling, 1999; and Westbrook, 1998.

There are few weed infestation sites on soils with high infiltration sites or high water tables outside of valley bottoms. (Land type and soil maps are available in the Project File at the Supervisor's Office in Dillon). Valley bottoms commonly have high water tables and generally high infiltration (fill deposits, moraine, or outwash). Valley bottom wetlands and riparian areas rarely are infested with weeds on the Forest. However, some small populations of aquatic and wetland weeds exist (leafy spurge, tansy). As for soil organic matter, weed treatment sites occur on both high and low organic carbon sites, but most weed occurrences are on low organic carbon and low nutrient soils.

A review of plot data on the BDNF suggests the effect of introduced noxious weeds on soil processes and soil quality has the following effects:

<u>On treated stands</u> where results have been effective, soil quality indicators such as structure, organic carbon levels, and baseline erosion rates appear to be normal and stable.

<u>On weed-dominated sites</u> where treatment has not occurred or has not been very effective, organic matter levels are lower and structure in the surface soil may have been altered. Erosion rates appear to have increased in some cases (see Ecodata in the electronic project file).

Past Weed Treatment: From 1959 to 1981, aerial spraying was done to reduce sagebrush, and then later to reduce mule's ear (*Wyethia* spp), (Payne 1972, Greitl 1982). Noxious weeds have not been treated with aerial spraying on the Forest.

Coordinated and monitored chemical weed treatment began after the development of Forest-wide noxious weed control strategies and environmental impact statements for the Beaverhead (1987) and Deerlodge (1989) National Forests. Before that, noxious weed herbicide spraying had been done via individual District projects since 1978. All herbicide application has been by ground-based equipment.

Environmental Fate, Soil Quality: The environmental fate of chemical herbicides applied to vegetation is generally determined by interactions within the soil (Vighi and Funari 1995, Foy and Pritchard 1996 and Kamrin 1997). Soil processes are grouped into five main categories (Donigian and Rao 1987). The ultimate distribution and fate of chemical herbicides is determined by interactions among these processes:

<u>Transport:</u> Movement through volatilization, runoff, erosion, and leaching.

<u>Sorption and partitioning</u>: Ability to adhere to soil particles - critical to leaching rate.

<u>Transformation and degradation:</u> Change to other forms - important to persistence.

<u>Volatilization:</u> Loss of chemical vapor from soil and plant surface.

<u>Root uptake</u>: Chemical taken up by plants, bioaccumulated, metabolized or degraded.

Currently, the data we have does not suggest that herbicides have had any adverse effects on soil quality or productivity. For example, annual or semi-annual herbicide-treated knapweed infested areas have lower knapweed cover and higher native grass cover than observed untreated knapweed stands. This suggests that soil quality and productivity has not been affected (weed data base, electronic project file). This agrees with studies elsewhere (Stalling, 1999).

On land types considered sensitive, especially valley bottoms and adjacent slopes, review of upland and riparian plot data suggest that treated weed sites have a higher similarity to native plant communities than untreated sites with a noxious weed component. (Electronic project file, Ecodata; Valley Bottom Survey). This information is also discussed in Chapter 4, Soil Resources.

3.5.7 Heritage Resources

Affected Area: The affected areas for heritage resources are those areas to be treated for noxious weeds. These sites lie within the boundaries of the Beaverhead-Deerlodge National Forest, as shown on the maps in Appendix B. Direct, indirect, and cumulative impacts can be assessed on the same affected areas.

Existing Condition: Weed infestations have not had any known impact on historic or prehistoric cultural sites on the Beaverhead-Deerlodge National Forest. Past herbicide and biological weed control efforts have not resulted in known effects on historic properties or traditional plant gathering areas.

Existing noxious weed infestations may have diminished populations of some plants traditionally used by tribes in the analysis area. The Confederated Salish and Kootenai Tribes have identified 150 native plants that have traditionally been used for food, medicine, and religious ceremonies. Sixty-nine of

these plants are adapted to riparian habitats, where weed infestations are not currently widespread. Others are adapted to Warm-Dry and Warm-Moist Potential Vegetation Groups or open sites. These latter sites are more susceptible to weed infestations.

No specific plant-gathering sites have been identified through scoping in the affected area.

There are no known direct or indirect impacts from past weed control actions to National Register eligible properties. Hand grubbing of weeds may break and displace undiscovered heritage resources. However, the limited acres of hand grubbing that have occurred have resulted in no known disturbance to heritage resources.

Potential impacts may occur to cultural gathering of plants by American Indian Tribes. The Salish-Kootenai and Shoshone-Bannock tribes have been contacted concerning this issue. Neither tribe has indicated any areas of concern.

Regulatory Framework: The following laws are the major statutes that guide and define the management of prehistoric and historic heritage sites on the Beaverhead-Deerlodge National Forest. This project complies with the following Acts.

The National Historic Preservation Act of 1966.

The Archeological Resources Protection Act of 1979.

The American Indian Religious Freedom Act of 1978.

The Native American Graves Protection and Repatriation Act of 1990.

The National Environmental Policy Act.

The National Forest Management Act.

The Beaverhead National Forest Land Management Plan (Forest Plan).

1868 Fort Bridger Treaty (Shoshone-Bannock Tribes of Fort Hall.

CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This Chapter describes potential environmental consequences of the proposed action and alternatives. Management direction is prescribed by the 1986 Beaverhead National Forest Plan and the 1987 Deerlodge National Forest Plan 1987. Effects are described by alternative for each resource category.

The level of detail in each description is commensurate with the importance of potential impacts by actions, and by the amount of information necessary to understand effects of the actions. It also provides the context for assessing how each alternative responds to the issues identified in Chapter 2. Maps of the analysis and cumulative effects areas are provided in Appendix B.

4.2 HUMAN ENVIRONMENT

Potential impacts to human health are measured by direct effects of herbicide drift onto non-target areas and qualitative reductions in airborne weed pollen.

4.2.1 Alternatives 1 and 3

Direct Effects: Short-term effects from herbicide drift during aerial spraying could occur. Application of drift mitigation measures (EIS 2.5.5) and adherence to manufacturer's label instructions will prevent harmful impacts to human health. Spot spraying will result in little drift as applications are made close to the ground surface.

In either case, the odor of herbicides may persist at spray sites for several days following ground-based or aerial application.

Short-term use restrictions will be in place during the application period. Mitigation will minimize human health impacts to Forest users as described in Chapter 2.5.5.

Indirect Effects: Alternative 1 will provide for the highest level of weed control, and therefore it will contribute the least amount of airborne weed pollen to the affected area.

None of the herbicides currently registered for wildland weed control are known to produce airborne by-products from burning treated vegetation in amounts hazardous to human health. This information is available in the *Risk Assessment for Herbicide Use in Forest Service Regions 1, 2, 3, 4, and 10 and on Bonneville Power Administration Sites, September 1992*. This publication is available in the project file and on the following website: http://www.fs.fed.us/foresthealth/pesticide/health.htm

Cumulative Effects: Application of chemical herbicides on adjacent ownerships combined with Forest applications will result in the same, short-term effects to air quality caused by chemical odor. During simultaneous applications the effect may cover a more extensive area. Since these effects to air quality are short term, they will not carry-over year to year. Because application rates will be within label specifications there are no anticipated adverse effects to human health.

Reductions in weed populations from continued treatment over time may reduce levels of weed pollen in the air at certain times of the year. However, in combination with native plant pollens, the cumulative beneficial effect on local air quality is unknown.

Because Alternative 3 applies chemical herbicides on about half the acres of Alternative 1, the effects of drift, odor and reduction in weed pollen will be about half. Reduction in weed pollen will be greater than in Alternative 3, roughly proportional to the difference in acres of direct weed control.

4.2.2 Alternative 2

Direct and Indirect Effects: Short-term effects to air quality are not anticipated as no direct chemical applications are used in this alternative. Indirect, beneficial effects of reduction in weed pollen on any particular site will occur if weeds are reduced on a site. Individually, these effects will be too small to affect local air quality. No chemical herbicides will be used, and there will be no herbicide by-products produced from burning vegetation.

Cumulative Effects: Because there are no direct effects to air quality from this alternative, there are no direct, cumulative effects. Indirect effects of weed pollen in the air will not be beneficial. Although weed density and vigor may be reduced on some sites, overall density and occurrence is anticipated to increase across the National Forest. The cumulative adverse impacts of weed pollen on local air quality are anticipated to increase, but its magnitude is not known.

4.3 VEGETATION

This section is written by alternative with three categories under each. Look for direct, indirect and cumulative effects for weeds, native plant communities and finally rare, native plant species.

4.3.1 Alternative 1

Direct and Indirect Effects to Weed Species: Under this alternative various methods such as pulling, biological control, and herbicide treatment would be used in combination to control, contain and/or eradicate populations of weed species. Aerial and ground application of herbicides would be used to treat large infestations in an effective manner.

Category 1 weeds: Weeds in this category exist in extensive, widespread infestations. (See Figure 3.5.1 in Chapter 3). A great deal of resources would be required to reduce or eradicate populations. Eradication of extensive large infestations could prove to be impossible, as we do not have the tools or technology to kill all plant parts and prevent regeneration. This is especially true of hardy species with extensive root systems.

The key management approach with these weeds is to control existing populations to prevent them from spreading and eradicate new populations in uninfested areas. Under the proposed alternative an Integrated Weed Management approach would prevent Category 1 weeds from spreading beyond current infestations. Category 1 weeds would not be eliminated but would be prevented from invading native plant communities.

Category 2 weeds: The overall coverage of these weed species is quite variable. (See Figure 3.5.2, 3.5.3 and 3.5.3 in Chapter 3). Some infestations are relatively large, yet they are still geographically limited to only a portion of the BDNF. Containment of these species is the primary goal. If contained, many of these weeds can be eradicated if acted upon immediately, thus preventing these new weeds from infesting native plant communities.

If eradication is not possible then control and containment is the goal to at least limit the impacts these species would have on the native ecosystem. Category 2 weeds should therefore be prevented from infesting new areas, and should be eliminated in some existing populations, while the remainder would be contained.

Category 3 weeds: These weeds are the highest priority for control on the BDNF. Monitoring and detection of this weed category is continuous. Discovery of these weeds prompts immediate eradication using the most efficient and appropriate Integrated Weed Management method. Under this alternative Category 3 weeds would not persist.

Manual methods of control are very labor intensive and are only effective on weed species without extensive root systems. This method can be effective on new infestations or very small sites with low density of weeds. Effective treatment requires the site to be checked multiple times during the growing season to prevent weeds going to seed. It also requires annual treatment until the weed is eradicated. Under Alternative 1 this method would be used on sites adjacent to open water, with high water tables, occupied by threatened, endangered or sensitive plant species. It will also be used on sites where other control methods would harm rare species.

Biological controls are present on the BDNF. Coordination with Animal and Plant Health Inspection Service (APHIS) to release and monitor current and new control agents will continue. Use of biological control is focused on Category 1 species. The nature of biological control agents is to reduce the density and seed production of the target weed, not to contain or eradicate the species.

On the BDNF, most biological agents have not had time to show significant results on the majority of weed species. However, some weed species, such as leafy spurge, musk thistle, and dalmation toadflax, have been exposed to biological agents and are show promising results in plant density and coverage reduction.

Herbicides available for use have a wide range of selectivity. Glyphosate is the least selective, affecting most plant species. Clopyralid is the most selective herbicide, affecting only plants in the sunflower (Asteraceae), buckwheat (Polygonaceae), and pea (Fabaceae) families. Nineteen of 40 BDNF weed species are in these families. The other herbicides fall between these two in their selectivity. Most affect all broad leaf plants but do not harm grass and grass-like species.

All BDNF weed species have broad leaves. Conifers have variable responses to herbicides but most are adversely affected. Application rate and extent of coverage, ether spot or broadcast, can affect what plant species are impacted by the herbicides. The project file contains a document copied from the Northwest Area Noxious Weed Control Plan EA (USDI 1985), describing the susceptibility of plants to herbicides used on the BDNF. That EIS is available on line at http://www.or.blm.gov/coosbay/cit97-11.htm.

Alternative 1 will potentially treat the largest number of weed infestations and has the greatest potential to achieve the desired control goals of the three weed categories. Aerial application of herbicides will greatly increase the efficacy of the weed control program. Larger infestation of category 1 and 2 weeds can be contained and weed densities greatly reduced. Ground crews will have more time to focus on smaller, scattered infestations, before they increase to the point where control is unreasonable. Many of the larger sites are essentially untreatable due to steep terrain and concerns for crew safety.

The availability of a larger array of herbicides will help reduce the overall impact of weed treatment on non-target native plants. Impacts to the native plant communities and rare plant species can be greatly reduced while still controlling the weeds on the site.

Cumulative Effects to Weed Species: In addition to reduced weeds on the Forest, this alternative would contribute to existing efforts by adjacent landowners, including the State, private and corporate owners, counties, and others, to control weeds. Actions under this alternative would allow the BDNF to work in closer collaboration with these surrounding landowners and counties to be more effective at controlling and containing weed infestations.

Direct and Indirect Effects to Native Plant Communities: There is little doubt that some measures taken in an Integrated Weed Management approach will kill some non-target, native plant species. It is important to note that although most weed control activities may kill some individual native plants, the action would be intended to prevent the far greater loss of species diversity which would result from further uncontrolled weed infestations.

Impacts to plant communities are much reduced when control actions are taken at an early stage of invasion. Affects on the communities increase as weed infestations expand in size and plant density. The increased impacts come not just from the weeds but also from the control measures. When treatments must be broadcast across an entire area and not specifically focused on the target plant, control measures have greater potential for negative impacts. This is true for manual, biological and herbicide treatments.

Pulling of target weeds has little affect on native vegetation. This is due primarily to the very limited area that can be affectively treated by this method and the fact you are pulling just the target plant. Pulling may affect adjacent plant species due to soils disturbance when removing the entire root system. Significant soil disturbance is rare and generally only seen where weed densities are very high. Mowing may reduce the vigor and reproductive ability of native plant species, which are mixed in with target weed. As the goal of mowing is to prevent weed species from producing viable seed timing of the treatment can be used to reduce the impacts to native species. For either of these methods the extent of their use is very limited and the proportion of native plant populations affected would be very small.

Biological control agents are rigorously selected and screened to prevent their impacts to non-target species. Biological control agents are useful because they generally avoid other non-target vegetation. These agents are listed by species, type, and damage to host plant in Appendix I.

Not all native species are tested for each new agent. A few biological control agents released prior to the current, more stringent screening protocols, have been found to feed on native plants. Their impacts have not fully been evaluated. Weed program coordinators rely on the screening process required by APHIS for updated biological agents. Because of the remote possibility of effects to native plant species, we will review decisions to release new agents on the Forest.

Use of herbicides has the highest potential to impact native plant communities. Herbicides use will kill non-target plants. The degree of mortality of native species depends on the herbcide used, the application method and rate and frequency of application. As discussed earlier the herbicides to be used range in their affects on plant species. Clopyralid is the most selective and Glyphosate is a non-selective herbicide that will kill most plant species including grasses.

Of the proposed application methods, aerial application is most likely to affect non-target native plants. This is because this method indiscriminately applies herbicide to all plants in the treatment area. Also, drift can affect plants outside the treatment area. However, precautions would be taken to minimize drift. Spot application with backpack sprayer, truck mounted sprayer or wick applicator focus the herbicide on the target weed with limited treatment to adjacent non-target vegetation. These methods would affect native species the least.

Under this alternative, Integrated Weed Management methods would be chosen that most effectively control invaders, and minimize the impact on native species. This approach should help decrease the effects of herbicide use. In addition, as only a small portion of the overall infested areas would be treated, the impacts to common native plants are insignificant when compared to species abundance, distribution and population viability on the BDNF.

This alternative will in the short term affect more native plants due to the broadcast application of herbicides by aerial application than the other alternatives. In the long term this alternative will protect more native plants and plant communities because of the same actions. Being able to treat a large number of infested acres will greatly improve the probability of controlling many of the weed species currently found on the BDNF.

Cumulative Effects to Native Plant Communities: In additon to native species that might be killed by herbicides, other actions such as timber harvest, grazing, recreational use, mining and harvest of alternative forest products could also kill native plants. Although non-target plants could be affected by an IMP approach involving herbicides, there is far greater potential for loss of these native species and their habitats if nothing is done.

The benefits of controlling and containing invaders and eradicating small infestations and new occurrences of Category 2 and 3 species are numerous. Fundamentally, these benefits include the preservation of native plants community diversity, structure and function. This in turn benefits to every living native organism dependent on the ecosystem.

Direct and Indirect Effect to Rare, Native Plant Species: As described in Chapter 3, very few rare plants species on the BDNF are currently affected by weed species. This is due to the limited nature of weed infestations on the Forest. Weeds have infested over 43,000 acres on the BDNF. This is only 1.2% of the total area of the Forest compared to the 1.2 million acres, or 35% of the Forest at risk for weed invasion.

There are 39 designated rare plant species on the BDNF. Of these, twenty-one grow in habitats highly susceptible to noxious weed infestation. Under this alternative the Integrated Weed Management strategy for invasive species could include several treatment methods such as hand pulling, mowing, biological control and herbicides. All methods have potential to impact rare plant species if weeds are present and treated where these plants occur.

Hand pulling weeds generally has the lowest impact to native plant species. This method pulls only the target plant with limited soil disturbance. Hand pulling is only affective when weed infestations are of a low density and cover a limited number of acres. This method is also only affective on those weed species not possessing extensive root systems. If hand pulling is used on sites with a moderate to high density of weeds soil disturbance can become significant and further enhance weed establishment.

Mowing can be effective to prevent further seed production by weed species. Timing of this treatment may impact rare plants on the site. If a weed flowers and sets seed at the same time as a rare plant, mowing may also affect the seed production of non-target species. Although mowing is not likely kill rare species, repeated mowing could weaken them by limiting their ability to grow, manufacture and store nutrients, and produce viable seed.

Coordination with Animal and Plant Health Inspection Service (APHIS) to release and monitor current and new biological control agents will continue. Biological control agents are generally host specific. In the cases where these organisms attack several species, they are typically ones that are closely related to the host. There are no biological control agents approved for release in the U.S., which are known to prey on the rare species listed for the BDNF. Use of biological control is primarily focused on Category 1 species. The nature of biological control agents is to reduce the density and seed production of the target weed, not to contain or eradicate the species. At this time most biological agents have not shown significant effects on the majority of weed species.

Of all the Integrated Weed Management strategies, the application of herbicides could have the greatest potential impact on rare plants species in the treatment area. If rare plants were susceptible to a particular herbicide, they would likely die in a broadcast spray area. If a backpack sprayer or truck-mounted handgun were used, the potential is less. However, nearby rare plants could potentially be affected by herbicide drift. Wick application, where herbicide is wiped directly onto the target weed, is the method least likely to affect rare plants.

The West Fork Buttes Botanical Area located on the Pintler Ranger District supports populations of *Arabis fecunda* and *Phlox kelseyi var. missoulensis*. Spotted knapweed is also established within the botanical area. Spot treatment of the knapweed with clopyralid has proven effective to reduce spotted knapweed while not harming these two rare species. (See Appendix K).

Regardless of the herbicide used, this alternative would require that surveys for rare plants be conducted by qualified surveyors at all previously unsprayed sites or where treatment involves aerial application. In these cases surveys would be conducted prior to treatment to assure that either no rare plants are in the area, or if rare plants do occur, an IPM approach is taken that would not reduce the viability of the rare plant population. In most cases this would mean that a non-herbicide method would be preferred in order to greatly reduce potential impacts. If an herbicide treatment were necessary to effectively control the spread of a weed, then it would be done in a manner where impacts to rare plants would not affect the viability of the species or population.

Based on the features of the proposed action, a biological evaluation has been conducted for these sensitive plant species. Analysis presented within this EIS serves as documentation of the biological evaluation. The evaluation determined the activities under this alternative may impact individual sensitive plant species but is not likely to cause a trend toward Federal listing or loss of viability to these species or populations.

It is important to note that although the use of herbicides may kill some individual plants, the action would be intended to prevent the far greater loss of species diversity which would result from further uncontrolled weed infestations. If minimal control is done, as in alternative 3, there is a great potential for the loss of many rare plant species.

Cumulative Effects to Rare Native Plant Species: This alternative would add to efforts by adjacent counties and landowners to control weeds surrounding the BDNF. Private and corporate landowners, State agencies, and others would benefit from reduced weed populations on the BDNF. Actions under this alternative would allow the Forest to work closely with surrounding landowners and managers to effectively control and contain weed infestations.

The existence of all rare plant populations on public and private land is unknown. There is potential for rare plant populations in unknown locations to be harmed by increased efforts on all ownerships, to control weeds

4.3.2 Alternative 2

Direct and Indirect Effects to Weed Species: This alternative relies on non-chemical treatments for controlling weed infestations. Manual, mechanical and biological control methods will be used to control weeds on the BDNF. Manual methods of control are very labor intensive and generally effective only on weed species that do not have extensive root systems. Pulling of the weed plant is the primary method used. Mechanical methods include mowing or cultivation of the site.

Pulling can be effective on new infestations or very small sites with low a plant density. For treatment to be effective the site needs to be checked multiple times during the growing season to prevent the weed from going to seed. The site must also be treated yearly until the weed is eradicated. Pulling will kill the individual plants that are removed so long as the entire root is taken. Pulling is not affective on species with extensive root systems, like leafy spurge or Canada thistle.

Mowing or use of a weed trimmer, where terrain permits, can revent weed species from going to seed. This is a very long-term control method. If the weed is kept from producing seed, eventually the individual plants may die out. Again, this is only for species that reproduce primarily by seed. Weeds with extensive root systems would not be controlled. In fact many such species are stimulated to increase their root systems when their tops are cut. Control by mowing is similar to pulling; the site must be retreated multiple times during the growing season to prevent the plant from producing any seeds. The site also must be treated annually as there is no carry-over, and benefits of the previous year's treatment are lost.

These methods are primarily used in areas adjacent to open water or high water table sites. It is also used where threatened, endangered or sensitive plant species are present and other control methods would harm the non-target species. Manual methods can be effective in localized sites. However, even with the relatively small amount of weed infestations on the BDNF it has been demonstrated by experience that no meaningful, widespread control results from the exclusive use of manual methods.

As mentioned above a variety of biological control agents are present on the BDNF. Coordination with APHIS to release and monitor current and new control agents will continue. Use of biological control is the primary focus for weed control under this alternative.

The object of biological control is to reduce the density and seed production of target weeds, not to contain or eradicate the species. At this time most biological agents have not shown significant effects on the majority of weed species. Biological controls have not had time to show an ability to control or reduce the rate of spread of weed species on the Forest. Leafy spurge and musk thistle, however, are susceptible to biological agents. Promising results show reduced plant density and coverage

The actual number of acres treated by this alternative would be very small. Biological control agents could be released on all weed infestations. Until the have time to become effective enough to reduce the density and spread of weeds, effective control is not yet apparent.

Methods have been developed to assess the risk of weed invasion to native plant communities (Rice & Rider 1995, Mantas & Jones 2001). These methods require potential vegetation map layers or vegetation stand attributes that were unavailable for this analysis. A similar weed risk assessment was completed for the BDNF based on current known weed infestations using cover types. This analysis shows approximately 35% (1.2 million acres) of the BDNF is at risk for weed invasion. Compared to the current 1.2% of infestations, this indicates large potential for increasing weeds if effective control measures are not implemented.

This risk assessment looks at plant communities that are susceptible to invasion by weed species. Based on current knowledge of local plant communities and the rate of new weeds established without of weed control, a large-scale infestation of at-risk communities would take more than a decade.

This assessment indicates the immense impact uncontrolled weed spread will have on the entire ecosystem. Almost no research has been completed for the rate of horizontal spread from an established weed infestation. By the risk assessment we know the potential for increased weed spread but the timeframe for this expansion is unknown. There are many variables that can influence how far a weed species would expand in any one year.

Cumulative Effects to Weed Species: Under this alternative, increased infestation expected on the BDNF is even more likely on adjacent private land. More so than public land, private land is often converted to agriculture, lawns, grazed pastured and commercial development. These are usually the types of sites where invaders are most successful.

Alternative 2 would compound this problem by making greater acreage available for invasion. Although most infestations originate outside the Beaverhead-Deerlodge National Forest, there are cases where invasions originate on the Forest and could potentially move out to invade private lands. Travel and recreation are likely to increase in the surrounding lands, which will likely increase the potential for invader weeds to spread both on and off Forest.

Direct and Indirect Effects to Native Plant Communities: Negative effects of the introduction of exotic species is well documented. A review of the many effects invasive species impose on native plant and animal communities can be found in Sheley and Petroff (1999). Exotic plant species decrease plant diversity, structure and function in native plant communities by out competing native species for available resources. Exotics have also been known to displace rare plant species (Thompson and others 1987, Lesica and Shelly 1996).

Some invaders release secondary compounds or allelopathogens that can affect the establishment of native plant species. Some people believe that there are situations where the invasion of exotic species is second only to habitat destruction as the most important threat to biodiversity.

Plant communities altered by invasion will not respond to historical disturbance regimes such as fire, insect and pathogens and wind and storm events as they once did. As noted earlier, we conducted a risk assessment to the BDNF, which showed the vulnerability of lands subject to invasion of weeds. The analysis shows 34%, a substantial portion of the Forest land base, at risk to weed infestations.

This acreage is not distributed evenly among the vegetation types. Higher elevation, moist forest types are the least vulnerable to invasion, yet every acre of the low elevation non-forested communities is at risk. Although there are fewer acres of non-forest communities they comprise some of the more unique, species rich communities next to riparian and wetlands on the BDNF. Once converted to weeds these habitats may never be restored.

Early successional stages of forest communities, most vulnerable to invasion, could be altered to a state where early forest succession could be impacted. Tree seedlings may have difficulty becoming established, which in turn may alter the future composition and vegetation structure of the forest.

Changes in early and mid-seral community structure would alter the frequency and intensity of natural disturbance processes (such as fire and insect infestations,) moving communities away from natural diversity. With decreased weed control treatment from existing levels, it is anticipated that most at-risk lands on the BDNF will become infested with weeds.

Cumulative Effects to Native Plant Communities: The same trends of increasing weed infestation expected on the BDNF are even more likely on adjacent private lands. More so than public lands, private lands are often converted to agriculture, lawns, grazed pasture and commercial development. These are generally the types of sites where invader species are most successful. The no herbicide alternative would compound this problem by making greater acreage available for invasion.

Although most infestations originate outside the Beaverhead-Deerlodge National Forest there are cases where infestations on the Forest could potentially invade adjacent private land. Travel and recreation are likely to increase in this area, which will likely increase the potential for invader weeds to spread on and off the Forest.

Direct and Indirect Effects to Rare, Native Plant Species: As noted in Chapter 3, all species identified as Federally Endangered or Threatened, Proposed for Federal Listing and Forest Service Sensitive are considered "rare" for the purposes of this analysis. Very few rare plant population sites are affected by weed invasion.

Weeds infest one site on the Forest that supports two rare plant species. The West Fork Buttes Botanical Area, on the Pintler Ranger District, supports populations of *Arabis fecunda* and *Phlox kelseyi var. missoulensis*. Spotted knapweed is also established within the botanical area. Weeds currently threaten no other known rare plant populations. The impacts of hand pulling, mowing and biological control agents are discussed above under alternative 1.

Slightly over half of the rare plant species known or suspected to occur on the BDNF grow in low to mid-elevation non-forested plant communities. These communities have much higher potential for weed invasion than forested sites, high elevation grasslands, and meadows. If left unchecked noxious weeds would slowly invade these sites.

Due to the limited coverage of rare plant species, aggressive weed invasion on a site can have drastic results. As weeds increase coverage they alter site characteristics to the point that rare species cannot be supported.

There are very few documented conflicts between rare plants and weed species on the BDNF. If we assume, however, that competition on certain sites may degrade rare plant habitat, this loss may

contribute to a loss of viability of native plants as a results of habitat degradation already occurring on private lands where these rare species occur.

Cumulative Effects to Rare, Native Plant Species: As with direct and indirect effects, cumulative effects of this Alternative are similar to Alternative 1.

4.3.3 Alternative 3

Direct and Indirect Effects to Weed Species: Effects of this Alternative are similar to Alternative 1. The primary difference is all herbicide treatments would be restricted to ground based application. No aerial application of herbicide would be allowed.

This alternative treats less than half the infested acres of noxious weed than alternative 1. Ground based control efforts would be limited in the area that can be treated in any one year, and those that can be reasonably accessed with spray equipment. Many sites have poor accessibility or of such steep terrain that it is not safe to have control personnel on the slope.

Control efforts would be focused on the smaller infestations of category 1 and 2 species that are easily accessible. Large infestations of category 1 weeds would continue to increase in size and density. Larger category 2 weed infestations may be contained but under this alternative it is more than likely these species will continue to spread and eventually transition to category 1 status. Prevention, monitoring and detection of category 3 weeds as well as detecting new sites of category 1 and 2 weeds will be hampered due to the amount of time taken to treat current weed infestations. This alternative would still be effective in preventing the establishment of category 3 weeds.

Cumulative Effects to Weed Species: This alternative maintains continued efforts by adjacent counties and ownerships to control weed surrounding the BDNF. Other types of landowners, including private and corporate owners, State, and others would benefit from reduced weed populations on the Forest. Actions under this alternative allow the BDNF to cooperate with surrounding landowners and counties to effectively control and contain weed infestations. However this would happen at a lower level than Alternative 1.

Direct and Indirect Effects to Native Plant Communities: Direct and indirect effects of this alternative are similar to alternative 1. The primary difference is all herbicide treatments would be restricted to ground based application. No aerial application of herbicide would be allowed. This alternative would impact fewer native plant species or communities by the application of herbicides. This is due to the elimination of aerial application of herbicides. The number of acres that can be treated by ground-based application is about half of Alternative 1 due to terrain, personnel and time constrains. Impacts to native plant communities will come more from the continued spread of weed species than the loss of non-target plants to herbicides.

Cumulative Effects to Native Plant Communities: In addition to the native species that would possibly be killed using an Integrated Weed Management strategy under this alternative, other ongoing actions such as timber harvest, grazing, recreational use, mining and harvest of alternative forest products would also kill native plants. Although non-target plants will be affected by using an Integrated Weed Management approach involving the use of herbicides, there is far greater potential loss of these native species and their habitats if nothing is done.

The same trends of increasing infestation that we expect to occur on BDNF lands are even more likely to occur in adjacent private lands. Much more so than public lands, private lands are often converted to agriculture, lawns, grazed, pastured and developed commercially. These are generally the types of sites where invader species are most successful. Treating fewer acres in this alternative would compound this problem by making greater acreage available for invasion. Travel and recreation are likely to increase in the surrounding lands, which will likely increase the potential for invader weeds to spread both on and off Forest.

Direct and Indirect Effects to Rare, Native Plant Species: Although similar to Alternative 1, the difference is that all herbicide treatments would be restricted to ground based application. No aerial application of herbicide would be allowed. In addition the only herbicides that would be available for use are listed on Page 2-10 in Table 2.4.3. The removal of aerial application of herbicides greatly reduces the potential for impacting rare native plant species.

Ground applications of herbicides are generally focused on individual spots where the weed is growing. Broadcast spraying by ground equipment is limited on the BDNF and those sites where it is feasible to cover small areas. Even if broadcast methods are used, the spray pattern can be altered when around rare plants. This will allow the majority of the feasible ground application sites to be treated while protecting rare plant.

Cumulative Effects to Rare, Native Plant Species: As with direct and indirect effects, cumulative effects of this alternative are similar to Alternative 1.

4.4 FISHERIES AND WATER QUALITY

It makes sense to analyze these resources together because of related impacts from herbicide application for the control of noxious weeds on the BDNF. Active ingredients proposed for use include Picloram, 2,4-D, Dicamba, Glyphosphate, Triclopyr, Hexazinone, Metsulfuron, and Fosamine ammonium.

Direct Effects: Potential direct effects to aquatic organisms from noxious weed management are largely associated with the herbicide application on and around streams lakes or wetlands. Contamination can occur through direct application to surface water, or by herbicides leaching through the soils into groundwater. It may also occur when herbicides are applied intentionally or accidentally to ditches, irrigation channels, or are carried away in runoff to surface waters (DiTomaso 1999). Each route of entry results in varied magnitude and duration of contamination. Figure 2.3.1 on page 2-4 describes the decision process for weed treatment in riparian areas.

Aerial spraying near aquatic zones has the most potential to expose aquatic organisms to contaminants; either through direct application or drift. Herbicides from ground-based equipment may also enter streams directly or through drift, but risk of contamination is reduced, because application occurs more slowly and applicators are able to immediately recognize problems and adjust application techniques.

Introduction via overland flow is a consideration for some herbicides. Risks vary with the persistence of active ingredients, soil composition and characteristics and the intensity and timing of precipitation events after herbicide application. Rothacher and Lopushinsky (1974, as cited by Norris 1981) indicated overland flow occurs infrequently on most well vegetated forests and rangelands because soil

infiltration capacity is usually greater than precipitation. However, denuded and compacted soil typically provides increased potential for surface runoff.

Mobilization in ephemeral stream channels is also a possible mechanism for herbicide entry to streams. Ephemeral stream channels may be difficult to see from the air and may be sprayed inadvertently. Ground application provides greater opportunity for identifying and avoiding these areas. Mitigating factors for overland delivery of herbicides to streams is that some level of dilution occurs before, during, and after delivery and a field inspector will be on site for all aerial spraying to monitor drift.

Leaching through the soil profile can occur, but generally poses the least risk to aquatic environments. While there are exceptions, most herbicides disappear quickly from both the ground surface and soil. Reduced potential for leaching is largely facilitated by: plant uptake of the herbicide; natural decomposition and volatilization of active ingredients; and/or adsorption of the herbicide by soil particles.

Picloram has the greatest potential to impact aquatic fauna. It persists longer than other chemicals considered, is slightly to moderately toxic to aquatic organisms and is the most commonly used chemicals to control weeds on the BDNF. (Watson, Rice and Monnig 1989, as reported in the Lolo NF Big Game Winter Range and Burned Area Weed Management DEIS, 2001).

Most groundwater contamination by herbicides results from point sources, such as spills, leaks, storage and handling facilities, improperly discarded containers, or rinsing equipment in loading and handling areas. Point sources are discrete, identifiable locations that discharge relatively high local concentrations of herbicides. Problems can be avoided through proper calibration and rinsing and cleaning equipment.

Indirect Effects: Indirect effects can result from alterations in the composition of vegetative ground cover through proliferation or reduction of noxious weeds. On sloped terrain, the possibility of surface runoff and sediment introduction into streams increases as weeds replace bunchgrasses. (Lacey et al. 1989). If sediment introduction is excessive, channel characteristics and fish habitat conditions could become degraded. Hickenbottom (2000) in the Lolo National Forest Big Game Winter Range and Burned Area Weed Management DEIS, 2001. (Project File)

Instream cover for fish might also change, based on alterations in riparian vegetation along stream margins. Additional effects to fish could include short-term changes in food supply, should aquatic invertebrates be susceptible to low concentrations of herbicides.

Cumulative Effects: Under this analysis, cumulative effects couple potential impacts from weed treatment on the BDNF with weed treatment off-Forest by other State, Federal and County Agencies and private citizens. In addition, other management actions that may combine to influence aquatic organisms (Table 3.5.11) in Chapter 3 are considered in this analysis.

Method of Analysis: Effects on aquatic organisms and their habitat, including Threatened, Endangered and Sensitive species, were analyzed by considering:

- Research results and other literature on individual herbicide characteristics and toxicities for different aquatic species,

- Studies evaluating potential for Herbicide entry into surface and groundwater, via different routes (leaching, overland flow, direct application, and drift),
- Results of recent analyses conducted by other National Forests in Region 1,
- Specific mitigations comprising part of each alternative for this EIS,
- Scope of the proposed treatments,
- Treatment methods proposed within alternatives,
- Proximity of proposed treatments to streams supporting westslope cutthroat and bull trout.

4.4.1 Effects on Water Quality Limited Segment (WQLS) Watersheds

WQLS watersheds and their specific impairments are given in Table 3.5.12. There are many reasons for impairment, ranging from agriculture to mining. There are no watersheds listed as impaired for reasons relating to application of herbicides. Consequently, none of the Alternatives will exacerbate existing conditions with regard to herbicides.

Whether or not a WQLS watershed is affected by any of the Alternatives will depend on the effect on the beneficial use for that watershed, aquatic life support and coldwater fisheries (trout). Beneficial uses are protected when the TMDL (Total Maximum Daily Load) requirements specified for a given watershed are met. However, there have been no TMDL requirements developed for the watersheds within the project area at this time. Consequently, protection of beneficial uses rest on the inherent toxicity of herbicides and the implementation of site-specific mitigation measures listed on page 2-13.

Herbicide Characteristics and Toxicities: Potential negative effects to aquatic organisms from herbicide applications, as proposed on the Beaverhead-Deerlodge Forest, are a function of several factors: 1) toxicity of those herbicides used; 2) concentrations of herbicide that reach the water (may have direct relationship with application rate); 3) duration of exposure; 4) impacts to food supply (i.e. aquatic insects); 5) Changes in riparian and upslope vegetation. Some potential for positive effects relates to reduced erosion as native or desired non-native vegetation replace weeds. The benefit associated with replacing weeds is considered small enough to be discountable in most cases, because weeds can provide some form of vegetative cover and therefore erosion reduction.

To determine whether herbicide application will impact aquatic organisms, safe concentration levels must be defined, then concentration levels that may result from the proposal should be estimated. Most chemical toxicities are defined by an LC-50 value, a concentration that results in 50% mortality over a specified period of time – usually 24, 48 or 96 hours.. Concentrations considered “safe” for aquatic organisms will typically be lower than the LC-50 value, with consideration given to the length of time individuals will be exposed to the chemical.

Table 4.4.1 compares lethal concentrations for active ingredients in several herbicides that tend to be toxic to aquatic organisms.

Table 4.4.1: Comparison of Lethal Toxicity Levels to Aquatic Organisms for Active Ingredients in Several Herbicides Proposed for Use on the BDNF.

Herbicide/ Species	Exposure	LC50 mg/L	NOEL mg/L
Picloram			
Cutthroat Trout	96 hr	1.5-8.6	
Cutthroat Trout			2.9
Cutthroat Fry	22 days		0.29
Lake Trout	96 hr	1.6-4.3	
Rainbow Trout	96 hr	4-58	
Daphnia spp.	48 hr	76	
Pteronarcys spp.	96 hr	48	
Clopyralid			
Rainbow Trout	96 hr	2000	
Daphnia	48 hr	1100	
Fathead Minnow	96 hr	2900	
Bluegill	96hr	4700	
Glyphosate			
Rainbow Trout	96 hr	8-220	
Chinook salmon	96 hr	19-220	
Bluegill	96 hr	24-120	
Chum salmon	96 hr	10-202	
Coho salmon	96 hr	27-210	
Coho salmon fry	96 hr	13	
Daphnia	48 hr	85-780	
Fathead minnow	96 hr	97	26
2,4-D			
Rainbow Trout	96 hr	15-420	
Chinook salmon	96 hr	>100	
Chorus frog	48 hr		50

Herbicide/ Species	Exposure	LC50 mg/L	NOEL mg/L
Chorus frog	24 hr	100	
Fathead minnow	96 hr	335-800	
Midge spp.	96 hr	100-405	
Pteronarcys spp.	96 hr	15	
Bluegill	96 hr	100-335	
Bluegill	8 days		5
Dicamba			
Rainbow Trout	96 hr	28	
Bluegill	96 hr	>50 – 135	
Daphnia	96 hr	> 96	
Gammarus spp.	96 hr	>100	

From this table the following observations are made: 1) Trout seem to show a greater propensity for being affected than other fish; and 2) Picloram tends to be more toxic to aquatic organisms than any of the other herbicides. With this in mind picloram is used as a surrogate for all herbicides to assess risks to aquatic species in this analysis. Some salmonids have been found to have substantial tolerance to Tordon 22K (brook and brown trout with 96 hr LC-50s of 91 and 52 ppm, respectively). Cutthroat and lake trout, however, exhibited much greater sensitivity in laboratory tests (96 hr LC50s of 1.5 - 8.6 mg/L). Tolerance can be affected by a number of things such as water chemistry (water hardness, temperature, pH) duration of exposure to the chemical and the developmental stage (i.e. egg, fry, fingerling or adult).

Establishment of a "safe" concentration level: Susceptibilities to weed treatment by herbicides are poorly defined for amphibian species, as well as other aquatic organisms. Their life histories involve both aquatic and terrestrial life stages, making them susceptible to toxicants in both environments. Many amphibians have vascularization in the epidermis of the skin, with little keratinization, simplifying uptake of many toxicants. Chemical contamination was reviewed in Cook (1981) and others, (as reported in Maxell 2000). Effects, (although not necessarily from the specific chemicals proposed for use in this document) range from mortality to reduced disease resistance, reproductive ability, morphological abnormalities and other things (Maxell 2000). Much of what is available has limited usefulness in helping determine impacts in this EIS, since the data is not specific to the species on the BDNF.

Aquatic toxicities noted in Table 4.4.1 showed trout to be more sensitive to 2,4-D than chorus frogs. Mayer and Ellersieck (1986) stated that amphibians tended to be less sensitive to 410 different chemicals evaluated in their study than invertebrates, crustaceans and fish. "It is often assumed that criteria for mammals, birds, and fish will incorporate the protection needed for amphibians" (Maxell 2000).

For this analysis, selection of a "safe" concentration level for fish follows recommendations presented in the Montana Fisheries Level 1 Team Briefing on Forest Herbicide Application, (March 21, 1999). The "safe" concentration level chosen is synonymous with a "maximum allowable toxicant concentration" or MATC equaling 0.12 ppm. This value was derived by taking 1/25 of 3.0 ppm (the 96 hour LC-50 for rainbow trout).

Determining levels of Picloram that may reach surface water: With herbicides such as picloram, risk of contaminating surface water is generally associated with overland run-off from the first storm following application, and/or flow from ephemeral channels and ditches that deliver the chemical to perennial streams. There is also some potential for leaching into groundwater, but this type of entry is limited in most circumstances. Concentrations in streams will generally peak in a 4 to 6 hour period following the precipitation event, then decline to very low levels within 10 hours, unless a second round of precipitation causes additional delivery.

Rational used to determine levels of picloram that could reach surface water parallels recommendations used in the Montana Fisheries Level 1 Team Briefing on Forest Herbicide Application, (March 21, 1999). The amount of herbicide reaching surface water depends on the ratio of runoff and infiltration dominant conditions and the total amount of herbicide applied within a given drainage. It was assumed 6% of the herbicide applied to runoff dominant sites could reach surface water, should an intense storm occur shortly after application. On infiltration dominant sites, 1% of the herbicide applied was deemed possible to enter surface water through subterranean flow.

Ratio of run-off versus infiltration dominant sites

Variability in site-specific conditions across the Forest is extremely difficult to accurately assess within a broad-scale analysis. To simplify, a very conservative, standardized approach was used - assuming 50% of all areas treated would be runoff dominant and 50% would be infiltration dominant. This should be – in nearly all cases – an overestimate of runoff type situations.

Application Rate

Although picloram is most often applied in Forest Service programs as the sole herbicide, it is also applied in combination with 2,4-D and less commonly with other herbicides. The most common methods of ground application for Tordon (active ingredient = picloram) involve backpack (selective foliar) and boom spray (broadcast foliar) operations. Labeled application rates for picloram range from 0.13 to 1.5 lb a.e./acre. However, the Forest Service typically uses rates in the lower part of this range - i.e., 0.3 to 0.56 lb a.e./acre. (The Risk Assessment for Herbicide Use in Forest Service Regions 1, 2, 3, 4, and 10 and on Bonneville Power Administration Sites, revised 1999)

Based on summary data from the Forest, an application rate of 0.5 lb Picloram/acre was used to model potential delivery of active ingredient to water bodies. One-half pound per acre represents an application rate occurring on only 5% of the acres treated. A high-end value for picloram (which has the greatest potential, of the herbicides we use, to impact aquatic organisms) was intentionally chosen to evaluate threats to aquatic organisms. If this rate of application poses little risk, then treatments should be able to be broadly implemented without various mitigations designed specifically for individual sites. The Following model was used to estimate potential concentrations of picloram in streams following Tordon 22K application.

Model used for Risk Assessment:

Step 1: Determine P, the total amount of herbicide to be applied in a watershed.

P (lbs) = R (lbs/ac) x A (ac) where R is the application rate of active ingredient and A is the total acreage treated. For picloram, we used a standardized rate of 0.5 lbs active ingredient/acre (see discussion above).

Step 2: Determine percent of treated area that will produce overland flow or allow infiltration.

It was assumed 50% of all areas treated would be runoff dominant and 50% would be infiltration dominant. See discussion above.

Step 3: Determine Y, the maximum yield in pounds of herbicide that could potentially reach surface waters.

For the purposes of this analysis, 6% for runoff dominant (50% of the acres treated) and 1% for infiltration dominant (50% of the acres treated) were used. Y (lbs) = (P/2) x D1 + (P/2) X D2 Where D1 is the delivery ratio for overland flow dominant sites (0.06) and D2 is the delivery ratio for infiltration dominant sites (0.01).

Step 4: Define the concentration level necessary to prevent impacts to bull trout.

For the purposes of this analysis 0.12 parts per million were used.

Step 5: Determine the minimum amount of water F (ultimately expressed in lbs) necessary to dilute the herbicide delivered to the stream to meet a targeted "safe" concentration of .12 ppm (1.2 X 10 –7).

Y (lbs) / 0.00000012 = F (cfs) x 62.43 lbs/cfs x T (sec) where F, the flow rate of the stream is expressed in cubic feet per second, and T denotes the estimated time in seconds which overland and infiltration derived flows would be yielding herbicide. A cubic foot of water weighs 62.43 pounds. The minimum delivery time for over land flow dominated systems is assumed to be six hours (21,600 sec).

Step 6

Determine discharges for storm related events using equations from Water Resources Investigation Report 92-4048 (US Geological Survey 1992). The Flint and Rock Creek drainages fall within the West Region when calculating flood-frequency discharges based on drainage –basin characteristics. All remaining areas on the Forest fall within the Southwest Region. Different regression equations are used for each region. All equations use drainage area as a common factor influencing discharge. The following standardizations and assumptions were made:

1) In the Flint and Rock Creek drainages, P (the average annual precipitation) in ranged from 27 – 35 inches/year based on 3 gauge sites. A single value of 34 inches/year was used in the model to calculate storm discharges.

2) In the Southwest Region HE (percent of area within the drainage above 6000 feet elevation). The Forest Boundary on the B-D in the SW region is almost always above 6000 feet. This value was standardized at 100% for the purposes of this model.

Step 7

Compare stream flows needed to provide adequate dilution F with storm event discharges calculated for individual 6th code HUCs.

Two year, 5 year, 10 year, 25 year, 50 year and 100-year storm event discharges were calculated for each HUC where herbicide treatment is proposed. In all cases, discharges for the smallest calculated storm events (2 year), when calculated for the entire acreage of the HUC, exceeded the amount of water necessary to meet the targeted "safe" concentration levels of picloram. It seems unreasonable, however, to presume that a storm would always be extensive enough or perfectly positioned to encompass an entire drainage.

The potential for isolated storm cells to develop, which produce intense rain showers within a small area, is always present. This possibility effectively reduces the drainage area that should be used to calculate storm event discharges from the total acreage within a HUC to the area directly covered by a potential storm. Thus, additional standardizations and assumptions were made:

1) If we are evaluating risk based on isolated storm cells, it is unlikely that large (25 – 100 year) storm events would occur. For the purposes of this model, the equation to calculate 2-year storm events (approximating bank full flows) was used as a standard.

2) The area that might potentially be covered by a small, isolated storm cell was considered and standardized at 3,840 acres (6 square miles).

3) For the purposes of this model, Two-year storm related discharges were calculated for all HUCs, based on a drainage area of 6 square miles.

Analysis Results

Using procedures outlined in the analysis above, extreme concentrations would never occur during Beaverhead-Deerlodge Forest weed spraying activities, unless a spill occurred directly into a stream from something like a vehicle accident. (See Water Quality under Mitigation on page 2-13.) Proposed treatments may still result in small amounts of herbicide entering waters of some 6th code HUCs where weed spraying occurs. The model indicates herbicide applications in all but a few 6th code HUCs on the Forest should remain well below "safe" concentrations and pose little risk to bull trout. This assumes project implementation and mitigation described in the EIS are followed.

Results from the model indicate treatments proposed for weeds within 36 of the 6th code HUCs across the Forest, show some risk for exceeding "safe" concentrations in surface waters. The data are listed in tables in Appendix B of the Biological Assessment for Fisheries. Within 20 of these HUCs, modeled concentration levels exceed the safe concentration by 1 - 35%. In actuality, instream concentrations should remain below 0.12 ppm and impacts to TES or other aquatic species should not occur, since mitigation measures defined in Chapter 2 provide significant protection and all standardized values used in the model, were extremely conservative. In one example, the model presumes a storm event will occur immediately after application, which produces significant overland flow.

The likelihood that an isolated, intense storm would occur right after extensive herbicide application and center itself on the treated area is very low. Observation of a weather forecast is required prior to aerial application. Using weather forecasts to guide herbicide application should effectively reduce the

concentrations delivered to streams by another 10 to 50%, provided forecasts are relatively accurate for at least 2 or 3 days. Based on results from Watson, Rice and Monnig (1989) photo-decay of Picloram ranged from 22 to 44% within 7 days. The following rational further supports the likelihood that impacts to aquatic species within those HUCs will be avoided.

1) Most range and forest lands represent infiltration dominant sites rather than overland runoff sites. The model was standardized to say that 50% of every site is run-off dominant.

2) A 6% delivery of herbicide during overland runoff events represents the upper end of rates documented in the literature.

3) A 300-foot buffer maintained for aerial spraying will serve to intercept water and allow added infiltration should precipitation events occur.

4) Stream flows increase as they travel down drainage; decreasing concentrations and further detoxifying chemicals.

5) Exposure to herbicides in the field would typically be only a fraction of the time organisms are exposed during 96-hour acute toxicity LC-50 tests in the lab.

6) The "safety threshold" used in this analysis is the most conservative threshold recommended.

7) Aerial treatment will not occur within 300 feet of a stream, lake or water body, which supports westslope cutthroat, bull trout or other species of special consideration.

8) The ecological risk assessment for picloram makes the assumption that runoff into surface water is unlikely in relatively arid areas -i.e., annual rainfall of less than 10 inches. This statement was qualified to some extent by saying "some runoff could occur during unusually severe rainfalls, at least at sites with high runoff potential".

9) The analysis is extremely conservative and does nottake into account the capability of aquatic organisms to move out of contaminated stream reaches.

Based on modeled results, 16 HUCs show some level of risk for concentrations to exceed "safe" levels as shown in the following table.

Table 4.4.2: List of sixteen 6th code HUCs where the model predicted picloram concentrations might exceed 0.12 parts per million, should a 2 year storm event create runoff from the treated area.

6th HUC	Name	Total Acres	Acres Treated	Lbs Picloram Applied @ .5 lbs/acre	Estimated Lbs Picloram Delivered to stream	CFS required @ 6% overland delivery	2 year storm event discharge (cfs) for 3840 acres	Max. amt of Picloram allowed for application to meet MATC
170102021204	Stony	21678	1051.5	525.76	16.9	105	43	335
170102020502	Gird	20772	862.6	430.81	13.8	85.2	43	335
170102020304	Boulder Low	12270	818.8	409.49	13.1	81	43	335

6th HUC	Name	Total Acres	Acres Treated	Lbs Picloram Applied @ .5 lbs/acre	Estimated Lbs Picloram Delivered to stream	CFS required @ 6% overland delivery	2 year storm event discharge (cfs) for 3840 acres	Max. amt of Picloram allowed for application to meet MATC
170102020303	South Boulder	13355	1025.2	513.62	16.4	101.4	43	335
170102020204	Middle Fork Rock	13262	736.3	368.15	11.8	72.8	43	335
170102020609	Unnamed	25555	1342.1	671.04	21.4	132.7	43	335
170102020501	Henderson	19288	1773.6	886.83	28.4	175.4	43	335
170102010404	LostCreek	31111	1523	761.48	24.4	150.6	29	225
170102010305	West Valley	30536	831.8	415.88	13.4	82.3	29	225
170102010202	Blacktail	24628	580.8	290.4	9.3	57.4	29	225
100200060302	Basin – Boulder	26628	563.1	281.56	9.0	55.7	29	225
100200060503	BoulderMid	35203	853.4	426.69	13.6	84.4	29	225
100200060502	Elkhorn	24413	791.9	395.97	12.7	78.3	29	225
100200060301	RedRock	19338	640.7	320.37	10.3	62.4	29	225
100200050106	Beall	39767	2889.9	1444.93	46.3	285.8	29	225
100200041105	WillowGulh	10925	878.9	439.47	14.1	86.9	29	225

Data includes the total acres within each HUC, acres proposed for treatment, estimated total lbs of picloram that would be applied at 0.5 lbs/acre, estimated lbs of picloram that could be delivered to the stream, stream discharge in CFS required to dilute picloram (delivered to stream) sufficiently to meet 0.12 ppm, estimated 2 year storm event discharges for an area covering 3840 acres (6 miles square), and the Maximum amount of picloram that could be applied while ensuring 0.12 ppm would be met, based on the model.

Limiting the total amount of picloram that can be applied within the individual HUCs listed above (Final Column), would ensure that instream concentrations remain below the 0.12 ppm and effects on organisms in the water would be discountable. Because of modeled results the following mitigations were instituted and are listed in Chapter 2:

Use of Tordon 22K will not exceed application of 335 lbs of the active ingredient picloram, within the same 12 month period, in each of the following 6th code watersheds; Stony, Gird, Boulder Low, South Boulder, Middle Fork Rock, Unnamed (# 170101010609), and Henderson. Similarly, use of Tordon 22k will not exceed application of 225 lbs of the active ingredient picloram, within the same 12-month period, in the Lost Creek, West Valley, Blacktail, Basin-Boulder, Boulder Mid, Elkhorn, Red Rock, Beall, and Willow Gulch 6th code watersheds. If treatment beyond the allowable amount of picloram is

necessary, in any of these watersheds, another herbicide will be chosen so that effects on bull trout, westslope cutthroat trout and other sensitive aquatic species will be discountable.

Maxell (2000) recommends a 100-meter buffer from waterbodies or wetlands until lethal and sublethal impacts of commonly used herbicides have been evaluated on all amphibian life stages. In response to this and other comments on the DEIS, buffers for aerial spraying near water bodies was extended to 300 feet. Within alternatives 1 and 3, direct contact with herbicides by amphibians in riparian areas can still occur, but it will be largely incidental. The broader more continuous coverage of aerial application should not pose a significant risk with implementation of the 300-foot buffer.

Ground application consists largely of spot application, reducing risk of exposure for high numbers of individuals. Western Toads and possibly other species can occur in extremely high densities around water bodies, shortly after they metamorphose from tadpoles into young adults. While, this could pose a risk to relatively large number of individuals, these situations should become apparent during surveys required for mitigation at the top of page 2-15. Where this occurs treatment will be postponed within the occupied area, (unless wick application or hand pulling will suffice) until the individuals have adequately dispersed. As additional research is conducted and toxicity information becomes available the Forest will consider modifying noxious weed treatment procedures as necessary to ensure continued protection of sensitive amphibian species.

The likelihood that any impacts to aquatic insects would result in notable indirect effects on TES fish or amphibian species is low. Available data suggest aquatic insects should not suffer significant reductions with exposure to of Tordon, dicamba, 2-4D, or clopyralid at concentrations projected to occur in streams. Negative effects to some aquatic insect species may occur on a localized basis. However, rapid re-colonization from upstream areas should compensate should negative effects occur. Thus, indirect effects to fish and amphibians from changes in food supply should be discountable.

4.4.2 Alternative 1

Direct and Indirect Effects: Under this alternative, effects from mechanical removal of weeds are discountable, because of limited occurrences. Biological control of weeds is not projected to have negative impacts. The primary risks to fish and amphibians are associated with herbicide application. A summary of proposed treatments, by sub-basin, within 300 feet of all streams is contained in the Biological Assessment for Fisheries attached in Appendix M.

Impacts to fish and aquatic life stages of amphibians from herbicides are related to changes in water quality and how that might affect mortality, growth, and development. With adult amphibians, effects are related to direct contact with the herbicides when they are out of the water and their sensitivity to that chemical. Effects include potential alterations to habitat and aquatic insects as a food source. The extent to which direct effects occur is a function of toxic characteristics of the herbicide; concentrations of herbicides to which the animal is exposed; duration of exposure; and susceptibility of the animal to chemical toxins in the herbicide.

Ground-based application of Picloram over the past 3-year period, ranged from 0.04 to 0.44 lbs/acre. Ninety-two percent of the acres treated on the BDNF, were by concentrations of less than 0.1 lbs/acre. Three percent were treated with concentrations between 0.11 and 0.30 lbs/acre; and 5% of the acres were treated at concentrations between 0.31 and 0.44 lbs/acre. These amounts are significantly lower

than the highest concentration allowed for use by the label (2 lbs/acre) or the application rate for aerial treatment (1 lb/acre).

Based on the previous discussion regarding potential routes for chemical entry into surface and groundwater, relative toxicities of herbicides proposed for use, the analysis of risk for Picloram to exceed 0.12 ppm concentrations in surface water, and mitigation presented in Chapter 2, it is unlikely there will be measurable direct effects to fisheries or amphibians. Effects on food supply and habitat should be negligible.

There may be slight benefits with reductions in noxious weed abundance, because of decreased potential for sediment delivery to streams. With improved ground cover, benefits to fisheries might not be measurable in most cases. Primary risks to aquatic organisms would increase only in the case of chemical spills or inadequate mitigation. (Herbicide spill plans are part of mitigation in Chapter 2.)

Whether or not Alternatives meet State Water Quality Standards depends on effects on aquatic life and trout. Beneficial uses in virtually all WQLS watersheds are Aquatic Life Support and Cold Water Fisheries. Because water quality and aquatic habitats will be maintained at a level that fully supports and protects designated beneficial uses, requirements to meet State Water Quality Standards will be fulfilled.

Cumulative Effects: The potential for cumulative effects may be greatest regarding adjacent or downstream herbicide application by other Federal, State or County Agencies or private citizens. Since potential concentrations of chemicals in surface waters are projected to remain below MATC levels and increased flows will provide adequate dilution as water flows downstream, and because literature on herbicides proposed for use (project file) indicate bioaccumulation won't occur in aquatic organisms, there will be no negative cumulative effects. There may be some positive cumulative effects through increased soil stability and reduced sediment introduction into streams.

This alternative is consistent with Forest Plan goals, objectives and standards for fish and other aquatic TES species.

4.4.3 Alternative 2

Direct and Indirect Effects: Mechanical, biological and cultural treatments will have limited effectiveness, due to limitations in the number of acres that can be treated. Noxious weeds would continue to spread across the Forest. As this occurs, sediment introduction into certain streams would likely increase at some rate, due to loss of vegetative ground cover. Extent of impact to fisheries habitat may be measurable in some situations and not in others.

There is little information on the impacts of weeds on amphibians. Non-native terrestrial weeds can sometimes form dense stands that may exclude native amphibians, potentially providing opportunities for other exotic species (Maxell 2000). Lack of herbicide application would remove all risk of impacting individual organisms, through exposure to toxicants.

Cumulative effects: Increased sediment may become detectable and slight deterioration in fish habitat could occur in certain streams. There is potential for effects from lack of weed control to combine with other actions to produce more significant sediment related impacts to fisheries.

Effects will become notable where weeds largely exclude native bunchgrasses over a relatively broad area proximal to a stream or other water body. In this situation, past, current and future impacts from livestock grazing, timber harvest, road building and maintenance, motorized recreation may combine to negatively effect aquatic populations.

Should weeds increase as expected, this alternative may be inconsistent with the following Forest Plan goals and standards:

1. Maintain or restore stream channel integrity, channel processes, and the sediment regime (including the elements of timing, volume, and character of sediment input and transport) under which the riparian and aquatic systems developed; (Inland Native Fish Strategy – Amendment to the Deerlodge Forest Plan; Riparian Goal #2); and

2. Maintain instream fishery habitat for spawning, rearing and adult life stages (Beaverhead Forest Plan, fisheries standard # 2; page II – 29.)

4.4.4 Alternative 3

Direct and Indirect Effects: Mechanical, biological and cultural treatments will be combined with ground application of herbicides under existing weed control programs. These control measures will more effectively control weeds than implementation of Alternative 2, but would be less effective than the Proposed Action. Weeds would likely continue to spread and potential for sediment introduction into streams would continue to increase at a relatively slow rate.

Based on the previous discussion regarding the following items it is unlikely there will be significant direct effects to fisheries or amphibians.

- Potential routes for chemical entry into surface and groundwater,
- Relative toxicities of herbicides proposed for use,
- Analysis of risk for Picloram to exceed MATC levels in surface water (the herbicide with the greatest risk for impacting aquatic organisms),
- Mitigation presented in Chapter 2,
- Rate at which Picloram and other herbicides tend to be applied on this Forest, and
- General pattern of application, (spot treatment rather than broad continuous coverage).

Effects on food supply and habitat should be discountable. Primary risks to aquatic organisms will increase without effective implementation of mitigation or an accident, such as an herbicide spill. (Herbicide spill plans are part of mitigation in Chapter 2.)

Whether or not Alternatives meet State Water Quality Standards often depends on effects on aquatic life and trout. Beneficial uses in virtually all WQLS watersheds relate to Aquatic Life Support and Cold Water Fisheries. Because water quality and aquatic habitats will be maintained at a level that fully supports and protects designated beneficial uses, requirements to meet State Water Quality Standards will be fulfilled.

Cumulative Effects: Cumulative effects from increased sediment introduction may become detectable and slight deterioration in fish habitat could occur in certain streams. The rate at which this would occur is slower than in Alternative 2. The potential exists, for effects from lack of weed control in some areas, to combine with other actions to produce more significant sediment related impacts to fisheries. Effects will become notable where weeds largely exclude native bunchgrasses over a relatively broad area in proximity to a stream or other water body. In this situation, past, current and future impacts from livestock grazing, timber harvest, road building and maintenance, motorized recreation may combine to negatively effect aquatic populations.

This alternative may be inconsistent with the following Forest Plan goal and standard: 1) Maintain or restore stream channel integrity, channel processes, and the sediment regime (including the elements of timing, volume, and character of sediment input and transport) under which the riparian and aquatic systems developed; (Inland Native Fish Strategy – Amendment to the Deerlodge Forest Plan; Riparian Goal #2): and 2) Maintain instream fishery habitat for spawning, rearing and adult life stages (Beaverhead Forest Plan, fisheries standard # 2; page II-29)

4.4.5 Threatened & Endangered Species.

A biological evaluation or biological assessment of the selected alternative will be completed for Federally listed threatened bull trout and Forest Service sensitive westslope cutthroat, boreal toad, and northern leopard frog. A comparison by alternative is provided in Table 4.4.4, of potential effects on key populations and habitat parameters for bull trout.

Table 4.4.3: Determination of Effects for Bull Trout. *(R=Restore, M=Maintain, D=Degrade)*

Diagnostic Pathways: Indicators	Effects of Actions		
	Alternative 1	Alternative 2	Alternative 3
SUBPOPULATION CHARACTERISTICS			
Subpopulation Size	M	M	M
Growth & Survival	D (Low risk, primarily associated with spill)	D	D (Low risk, primarily associated with spill)
Life History Diversity & Isolation	M	M	M
Persistence & Genetic Integrity	M	M	M
WATER QUALITY			
Temperature	M	M	M
Sediment	M	D (Limited potential for this to be significant in next 10 years)	D (Limited potential for this to be significant in next 10 years)
Chemical Contaminants/ Nutrients	D (Low risk, primarily associated with spill)	N/A	D (Low risk, primarily associated with spill)
HABITAT ELEMENTS			
Substrate Embeddedness	M	D (Limited potential for this to be significant in next 10 years)	D (Limited potential for this to be significant in next 10 years)
Large Woody Debris	M	M	M

Diagnostic Pathways: Indicators	Effects of Actions		
	Alternative 1	Alternative 2	Alternative 3
Pool Frequency & Quality	M	M	M
Large Pools	M	M	M
Off Channel Habitat	M	M	M
Refugia	M	M	M
CHANNEL CONDITIONS & DYNAMICS			
Wetted Width/ Maximum Depth Ratio	M	M	M
Streambank Condition	M	M	M
Floodplain Connectivity	M	M	M
FLOW HYDROLOGY			
Change in Peak/Base Flows	M	M	M
Drainage Network Increase	M	M	M
Road Density and Location	M	M	M
Disturbance History	M	M	M
Riparian Conservation Area	M	M	M
Disturbance Regime	M	M	M
Integration of Species and Habitat Conditions	M	M	M

Table 4.4.4: Biological Evaluation of Alternatives.

Alternative	Bull Trout	Westslope Cutthroat Trout	Boreal Toad	Northern Leopard Frog
Alternative 1	MA-NLAA*	MIIH*	MIIH*	MIIH*
Alternative 2	NE	NI	NI	NI
Alternative 3	MA-NLAA*	MIIH*	MIIH*	MIIH*

No Effect (NE); May Affect – Not Likely to Adversely Affect (MA-NLAA); May Affect – Likely to Adversely Affect (MA-LAA); No Impact (NI); May Impact Individuals, but will not lead toward listing or loss of viability to the population or species (MIIH); Will Impact Individuals, and may lead toward listing or loss of viability to the population or species (WIFV).

4.5 WILDLIFE

Noxious weed management has the potential to impact wildlife in the following ways:

- A change in, or removal of, vegetation as a result of weed treatment (herbicide or mechanical treatment) may alter habitat.
- Human disturbance associated with treatment can cause displacement of wildlife.
- Direct impact from contact with treated vegetation or direct contact with herbicide.

These impacts would be of most concern in areas of high seasonal use by wildlife or in a limited habitat (for example, winter ranges, calving areas, and nesting areas). Noxious weeds occur randomly throughout the Forest, however they currently have the greatest impact in lower elevation sagebrush/grassland and in limited riparian areas. This affects elk and deer winter range, sage grouse habitat, sagebrush related species habitat and various small mammal habitat. This discussion focuses on these areas and is based upon the following assumptions:

- Application of herbicides at rates consistent with manufacturer's label direction would prevent unacceptable impact (exposure to herbicide levels high enough to be toxic) on wildlife species through direct contact, ingestion or contact with recently treated vegetation.
- Application of biological controls consistent with APHIS regulations would provide the limits to ensure that bio-control agents would not impact native wildlife or habitat.

Noxious weeds do not provide the same food or cover value as native vegetation. A noxious weed monoculture represents a loss of biodiversity. The risk of allowing noxious weeds to spread into native habitats would be greater than any impacts to wildlife from regulated noxious weed treatment.

There are unknown effects associated with weed treatment. These include, but are not limited too: 1) The degree of weed infestation that renders a habitat unsuitable; 2) Impact to insects; and 3) Impact of "new" weed species.

The determination of impacts is based on documents listed in literature cited, discussion with other biologists (USDA-Forest Service, MFWP, BLM), and personal observations within the Beaverhead-Deerlodge National Forest (1987-present).

Table 4.5.1: Summary of Potential Impacts of Weed Control to Threatened and Endangered Species on the BDNF. Threatened ("T"), Endangered ("E"), Sensitive ("S"), and Management Indicator Species (MIS.)

Species	*Potential Impact*	*Reason*
Grizzly bear (T)	Not Likely to Adversely Affect	Little habitat overlap; possible disturbance
Peregrine falcon (E-Delisted)	Not Likely to Adversely Affect	Little habitat overlap; possible disturbance
Bald eagle (T) Proposed to Delist	Not Likely to Adversely Affect	Little habitat overlap; possible disturbance
Canada lynx (T)	Not Likely to Adversely Affect	Little habitat overlap; possible disturbance
Gray wolf (E)	Not Likely to Adversely Affect	Little habitat overlap; possible disturbance

Species	*Potential Impact*	*Reason*
Gray wolf (Nonessential Exp)	Would Not Jeopardize	Little habitat overlap; possible disturbance
Mountain plover (Candidate-T)	No Effect	No habitat or Species found on the Forest
Sage grouse (MIS & S)	May Impact Individuals or Habitat, but Will Not Likely Contribute To A Trend Towards Federal Listing or Reduced Viability For the Population or Species	Impact to habitat and disturbance to species in isolated areas
Northern goshawk (MIS & S)	No Impact	No habitat overlap
Trumpeter swan (MIS & S)	No Impact	No habitat overlap
Pygmy rabbit ((S)	May Impact Individuals or Habitat, but Will Not Likely Contribute To A Trend Towards Federal Listing or Reduced Viability For the Population or Species	Impact to habitat and disturbance to species in isolated areas
Common loon (S)	No Impact	No habitat overlap
Wolverine (S)	No Impact	No habitat overlap
Harlequin duck (S)	No Impact	No habitat overlap
Fisher (S)	No Impact	No habitat overlap
Flammulated owl (S)	No Impact	No habitat overlap
Black-backed woodpecker (S)	No Impact	No habitat overlap
Townsend's big-eared bat (S)	No Impact	No habitat overlap
Burrowing owl (S)	No Impact	Species not on Forest
Northern bog lemming (S)	No Impact	No habitat overlap
Columbian sharp-tailed grouse (S)	May Impact Individuals or Habitat, but Will Not Likely Contribute To A Trend Towards Federal Listing or Reduced Viability For the Population or Species	Impact to isolated habitat; species not found on Forest

4.5.1 Alternative 1

Direct & Indirect Effects: The Biological Assessment finds there will be no effect on the endangered gray wolf, the threatened grizzly bear, bald eagle, and Canada lynx, the nonessential experimental gray wolves and the proposed mountain plover. The US Fish and Wildlife Service concurred on April 15, 2002. The chance for direct contact with herbicides, ingestion of herbicide or contact with applicators is unlikely. Wildlife would not be in the location of infestations because of poor forage, not to mention the

disturbance cause by work crews on or near roads and trails. These areas are already associated with human disturbance.

Small mammals and insects may come into contact with herbicide according to the risk assessment for picloram, the herbicide commonly used in Tordon for knapweed treatment on the Forest. The assessment makes this statement about terrestrial organisms. "The potential for adverse effects on other terrestrial nontarget animal species appears to be remote. The weight of evidence suggests that no adverse effects in terrestrial animals are plausible using typical or even very conservative worst case exposure assumptions." However, adherence to label specifications for herbicide application would prevent exposure to toxic levels of herbicide. More details are available for picloram and other chemicals used in herbicides in the project file and on the web: http://www.fs.fed.us/foresthealth/pesticide/risk.htm.

Aerial spraying, because of noise and ground crew activity, such as flagging and field inspector presence, has high potential to displace wildlife during the time of application. This brief disturbance in areas not usually associated with human presence in remote steep parts of the Forest further reduces direct impacts to wildlife from herbicides because of animals will move away during the operation. The relative size of treatment areas has no potential to affect populations as a whole.

Wildlife that lives in forested habitat, especially sensitive species, such as Goshawks and Black-backed woodpeckers, are not likely to experience effects. As stated on page 2-3: if overstory vegetation prevents herbicides from getting to the weed, then aerial application is not warranted. This primarily eliminates aerial treatment of infestations under moderate to heavy canopy. Other effects to wildlife species are contained in the Biological Analysis and Evaluation in Appendix M and the Project file.

This alternative would have little impact to species associated with sagebrush/grasslands or riparian areas, as most treatment is planned for ground application in areas that have a human presence, roads, trails, timber harvest, administrative sites, and campgrounds for example. These areas provide little effective wildlife habitat.

Treatment areas would have reduced vegetative cover for a period of time after treatment. This reduces habitat effectiveness of the areas treated and wildlife may be displaced until the native vegetation recovers (next growing season for grasses, 5-10 years for forbs and fifteen plus years for sagebrush). This would have the most affect on elk (winter range), sage grouse (nesting/brooding), sage thrashers (nesting), pygmy rabbit (yearlong) and Columbian sharp-tailed grouse (nesting/brooding).

Cumulative Effects: Current trends in range management are designed to improve conditions in riparian and upland areas by reducing the numbers of cows and shortening grazing seasons. Although the short-term result is unavailable habitat, the long-term result improves riparian and upland conditions creating more habitat for wildlife.

Loss of habitat from mining, reconstruction of existing campgrounds, trails, and roads, recreational use/activity, subdivision and home construction, some timber harvest and introduction of non-native species (wildlife and vegetation) have the greatest cumulative impact to wildlife and bird species. Alternative 1 would help to lessen this impact by taking an aggressive approach to reduce noxious weeds in available habitat.

The current amount of habitat disturbed by weed treatment would have little impact on the species listed in this section, as the area treated is very small in proportion to available habitat. Long-term impacts from noxious weed treatment would be improved habitat in sagebrush/grassland as treatment areas recover to native vegetation and weed infestations decrease within the affected habitats

4.5.2 Alternative 2

Direct and Indirect Effects: There would be little direct effect to wildlife under this alternative because direct contact with people performing weed treatment is highly unlikely. In addition wildlife would not be in the location of weed infestations due to low habitat effectiveness and location in areas associated with disturbance, near roads/trails

Temporary disturbance and displacement would occur within the treatment areas. This would have little impact to the species associated with sagebrush/grasslands or riparian areas, as most treatment takes place in areas that have a human presence (i.e. roads, trails, timber harvest, administrative sites, campgrounds). These areas provide little effective wildlife habitat.

Remote/inaccessible sites would have a longer tem of human presence during treatment than Alternatives 1 and 3 because of the increased time to treat infestations. This would displace/disturb wildlife for the treatment period.

Areas treated would have a minor reduction in vegetative cover for a period of time after treatment. This would slightly reduce the habitat effectiveness of the areas treated and wildlife may be displaced until the native vegetation recovers (next growing season for grasses and forbs, sagebrush should remain undisturbed, but would take fifteen plus years in areas heavily impacted by weeds). This would have the most affect on elk (winter range), sage grouse (nesting/brooding), sage thrashers (nesting), pygmy rabbit (yearlong) and Columbian sharp-tailed grouse (nesting/brooding).

The current amount of habitat disturbed by weed treatment would have little impact on these species, as treatment areas are very small in proportion to available habitat. Long-term impacts (greater then 5 years) of noxious weed treatment would be an improvement in sagebrush/grassland habitat as treated areas return to a more native habitat.

Cumulative Effects: Would be the same as described for Alternative 1, however, the impact from non-native vegetation (noxious weeds) would continue from an increase in noxious weeds.

4.5.3 Alternative 3

Direct & Indirect Effects: There would be no direct effect to wildlife because the chance for direct contact with herbicides, ingestion of herbicide or contact with applicators would be highly unlikely. Wildlife would not be in the location of weed infestations due to low habitat effectiveness and location in areas already associated with disturbance.

Temporary disturbance and displacement would occur within the treatment areas. This would have little impact to the species associated with sagebrush/grasslands or riparian areas, as most treatment would take place in areas that have a human presence (i.e., roads, trails, timber harvest, administrative sites, campgrounds). These areas provide little effective wildlife habitat. Small mammals and insects may come into contact with herbicide according to the risk assessment for picloram, the herbicide commonly used in Tordon for knapweed treatment on the Forest. The assessment makes this statement about

terrestrial organisms. "The potential for adverse effects on other terrestrial nontarget animal species appears to be remote. The weight of evidence suggests that no adverse effects in terrestrial animals are plausible using typical or even very conservative worst case exposure assumptions." However, adherence to label specifications for herbicide application would prevent exposure to toxic levels of herbicide. More details are available for picloram and other chemicals used in herbicides in the project file and on the web: http://www.fs.fed.us/foresthealth/pesticide/risk.htm.

Treatment areas would have a reduction in vegetative cover for a period of time after treatment. This reduces habitat effectiveness of the areas treated and wildlife may be displaced until the native vegetation has recovered (next growing season for grasses, 5-10 years for forbs and fifteen plus years for sagebrush). This would have the most impact on elk (winter range), sage grouse (nesting/brooding), sage thrashers (nesting), pygmy rabbit (yearlong) and Columbian sharp-tailed grouse (nesting/brooding).

The current amount of habitat disturbed by weed treatment would have little impact on these species. Available habitat makes up a very small portion of treatment areas. Long-term impacts (greater then 5 years) of noxious weed treatment would be an improvement in sagebrush/grassland habitat as treated areas recover to more native vegetation.

Cumulative Effects: Would be the same as described for Alternative 1, however, the impact from non-native vegetation (noxious weeds) would continue from an increase in noxious weeds.

4.6 SOIL RESOURCES

Noxious weed occurrence generally has a negative effect on the soil resource. Even at current low densities on the Forest, weeds are having a measurable effect on the soil resource. For example, investigation of soil conditions suggests that organic matter input has been reduced under knapweed stands compared to soil organic matter input from native, diverse communities. (Lacey and Marlow, 1990).

Where introduced weeds dominate a site, erosion rates can increase (Lane, Marlow, and Lacey, 1988). Noxious weed stands alter the composition, structure, and function of native biological diversity above and below ground (Bezanson, 1995; Hooper, 2000). Weed stands commonly reduce the biomass and yield of native and cultivated plants (Hill and Ramsay, 2001). Positive effects from weeds can only be documented on severely disturbed sites. In these cases, weeds provide some cover, protect soil from erosion, break up subsoil, and accumulate elements from the subsoil (Hill and Ramsay, 1977).

Herbicide misuse through treatment of noxious weeds can potentially affect soil properties and soil productivity and can move or be leached through the soil to ground water (Kamrin, 1997; Vighi and Deguardo, 1995; Singh and Tan, 1996; Fletcher and Freedman, 1986). For example, over-treatment with a broad-spectrum herbicide can increase erosion rates and decrease soil organic matter.

Herbicide misuse can alter the biological components and functions of the soil. Herbicides can move chemically unaltered, via soil macropores or preferential flow to groundwater. Following herbicide label requirements can prevent negative soil and water effects from occurring. No over-treatment effects on soil or groundwater contamination have occurred since the implementation of noxious weed treatment under the1987 and 1989 Beaverhead and Deerlodge Weed Decisions, respectively.

4.6.1 Alternative 1

Direct and Indirect Effects: As noted in Chapter 3, soils with high infiltration or a high water table, or both, have been classified and mapped. The criteria for this classification was queried from the Beaverhead-Deerlodge NF Land Systems Inventory and North and South Zone Soil Surveys and follows the Montana Department of Environmental Quality RAVE model parameters for aquifer vulnerability (DeLuca and Johnson, 1990). A map of herbicide treatment areas overlaid with a map of surveyed forest soil types shows that weed infestations and the modeled soil criteria overlap in relatively few areas. These overlays are available in the project file, at the Supervisors Office in Dillon, Mt.

In the RAVE model, any value of 65 or greater triggers the use of alternative herbicides with lower leaching potential through soil. Values of 80 or above trigger use of methods other than herbicide treatment. Using the soil criteria noted above and in Chapter 3, modeling a typical non-flood plain valley bottom road treatment scenario (e.g., Big Lake Creek road in the Big Hole), and the herbicide Picloram, a value of 57 is produced. A non-valley bottom scenario produces a value of 46. A typical aerial application scenario (non-valley bottom) produces a value of 41; and a valley bottom flood plain situation yields a value of 77.

As everywhere, label direction will be followed in these areas to prevent groundwater contamination from mobile herbicides. In addition, soil standards require that no herbicide be applied within 100 feet of surface water. No effects are thus expected from ground or aerial herbicide application to groundwater.

Herbicide misuse can lead to serious soil ecological effects. For example, Fletcher and Freedman (1986) found toxic threshold levels of herbicides where decomposer organisms responsible for litter decomposition and nutrient cycling are killed or shut down in the soil. However, these thresholds were up to 50 times greater than the residue concentrations that occur following treatment according to label specifications. All herbicides proposed for use are registered for their intended use and when used according to label specifications no soil contamination, over-treatment effects, or long-term soil quality effects are expected.

Cumulative Effects: Currently, watersheds on the Forest are mostly stable with a native plant community ground cover. Road building or maintenance, logging, grazing, mining, and some recreational activities occur across the Forest, which disrupted plant communities and soil in some places. Weeds occupy some of these disturbed areas. They also occupy some areas where significant soil disturbance has not occurred.

Ground and aerial herbicide treatment will not cause soil disturbance and is not expected to add to existing levels of soil instability or degradation. Soil stability, watershed stability, and soil quality are expected to stay the same. As previously noted, heavy weed infestations can disrupt plant communities and soil stability and increase soil erosion rates. Herbicide treatment is expected to maintain or improve current plant community stability and thus help maintain soil stability and quality.

Picloram is the most persistent of the herbicides proposed for use, being moderately to highly persistent in the soil environment with half-lives in the field reported from 20 to 300 days (Kamrin, 1997). Based on the predicted movement and persistence of the herbicides and the proposed treatment scenarios, no accumulation of herbicides is expected in either soil or groundwater. Under the

proposed treatment conditions as modeled by RAVE, the herbicides proposed for weed treatment, including Picloram, are expected to decompose in one year or less in the soil by natural processes (Kamrin, 1997).

4.6.2 Alternative 2

Direct and Indirect Effects: This alternative would allow noxious weed populations to increase rapidly (see Chapter 1.) As noted in Chapter 3 for soil resources and the introduction to this section, heavy noxious weed stands alter above and below ground composition, structure and function. Soil quality degradation would increase to the approximate acreage of weed spread. Base soil erosion rates would increase, soil organic matter would decline, and soil productivity would decline.

Cumulative Effects: Currently, watersheds on the Forest are mostly stable with a native plant community ground cover. Road building or maintenance, logging, grazing, mining, and recreational activities occur across the Forest, which disrupt plant communities and soil in some places. Weeds occupy some of these disturbed areas and areas where significant soil disturbance has not occurred.

For the reasons cited previously, this alternative would markedly increase soil instability on these areas. Soil quality would decline further on these areas. In addition to plant community and soil stability declines, overall watershed stability would also decline. Runoff would increase and the soil would hold less water for shorter periods. Lower moisture storage and greater runoff would possibly increase the recharge period for springs. Late season stream flows would likely decrease.

4.6.3 Alternative 3

Direct and Indirect Effects: This alternative would continue the current effects from noxious weed occurrence and treatment. The noxious weed rate-of-spread of 2-3% per year under the current treatment program would continue. Soil quality and watershed stability would decrease at approximately the same rate and to approximately the same acreage as that occupied by noxious weeds. This alternative would ultimately produce the same effects as Alternative 2, but would take at least twenty years longer at the current rate of spread and treatment efforts.

Cumulative Effects: Currently, watersheds on the Forest are mostly stable with a native plant community ground cover. Road building and maintenance, logging, grazing, mining, and some recreational activities occur across the Forest, which have disrupted plant communities and soil in some places. Weeds occupy some of these disturbed areas and some areas where significant soil disturbance has not occurred.

Ground-based herbicide treatment will not cause soil disturbance and is not expected to add to existing levels of soil instability or degradation. Maintenance of soil stability, watershed stability, and soil quality is expected.

As noted in Chapter 3, and in the introduction to this section above, heavy weed infestations can disrupt plant communities, soil stability, and increase soil erosion rates. Herbicide treatment is expected to maintain the current plant community stability and thus help maintain soil stability and quality.

Picloram is the most persistent of the herbicides proposed for use, being moderately- to highly-persistent in the soil environment with half-lives in the field reported from 20 to 300 days (Kamrin,

1997). Based on the predicted movement and persistence of the herbicides and the proposed treatment scenarios, no accumulation of herbicides is expected in either soil or groundwater. Under the proposed treatment conditions as modeled by RAVE, the herbicides proposed for weed treatment, including Picloram, are expected to decompose in one year or less in the soil by natural processes (Kamrin, 1997).

4.7 HERITAGE RESOURCES

The remains of approximately 12,000 years of human history and prehistory are spread across the Beaverhead-Deerlodge National Forest. Many of these archeological and historic sites are important for the scientific, historic, cultural, and aesthetic values they possess.

4.7.1 Alternative 1

Direct and Indirect Effects: While full recovery of communities dominated by invasive and noxious weed may not be achieved, this alternative best controls the expansion of existing weed populations, and inhibits new species and population centers from becoming established. This would result in the lowest loss of biotic heritage resources. There is no impact to archeological and historic sites from aerial application of herbicide. Ground application takes place in areas already disturbed along roadways and trails, constructed ditches, etc. Site disturbance probability is low, based on areas of proposed treatments and the level of past disturbance. Biological control has no potential to impact historic resources.

Areas proposed for mechanical treatment (hand pulling) are limited to an annual total of 35 of the 43,000 infested acres, or .08% of identified weed infestations. The amount of acres with the potential to be affected is negligible. Mechanical treatment will take place on small sites in riparian areas where herbicides and vehicles are not appropriate. Of the known historic sites on the BDNF, none are located in areas of weed infestation proposed for that type of treatment. Mechanical treatment would have no effect on the qualities that make the sites eligible for the National Register of Historic Places.

Cumulative Effects: While full recovery of communities dominated by invasive and noxious weeds may not be achieved, this alternative could prevent the expansion of existing weed populations, and could hinder new species and population centers from becoming established. This would prevent any further loss of biotic heritage resources to erosion.

This alternative should have no effect on historic or prehistoric cultural resources. Additionally, this alternative ensures continued use of native plants for traditional uses by preserving native plant communities.

4.7.2 Alternative 2

Direct and Indirect Effects: Areas proposed for mechanical treatments are limited to less than 350 acres. Mechanical treatments have a greater potential to disturb cultural sites than do biological or chemical control measures. Ground disturbance from hand pulling, clipping, and mowing is anticipated to be small, localized, and limited to areas already heavily disturbed.

Site probability is low based on areas of proposed treatments and the level of past disturbance. With the increased acres proposed for mechanical treatment, the likelihood of impacting heritage resources is greater than in alternatives 1 and 3, but still is relatively low.

This alternative should have no effect on historic or prehistoric cultural resources. Additionally, this alternative ensures continued use of native plants for traditional uses by preserving native plant communities.

Cumulative Effects: While full recovery of communities dominated by invasive and noxious weeds may not be achieved, this alternative could prevent the expansion of existing weed populations, and could hinder new species and population centers from becoming established. This would prevent any further loss of biotic heritage resources to erosion.

This alternative should have no effect on historic or prehistoric cultural resources. Additionally, this alternative ensures continued use of native plants for traditional uses by preserving native plant communities.

4.7.3 Alternative 3

Direct and Indirect Effects: This alternative is based on treatment continuing at current levels. The continued spread of existing noxious weed populations and the establishment of new species that we currently experience is not likely to have an effect on non-biotic heritage resources. Areas proposed for mechanical treatment are limited to 35 acres annually. Mechanical treatments have a greater potential to disturb cultural sites than do biological or chemical control measures. The amount of acres with the potential to be affected is negligible. Mechanical treatment will take place on small sites in riparian areas where herbicides and vehicles are not appropriate. Of the known historic sites on the BDNF, none are located in areas of weed infestation proposed for that type of treatment. Mechanical treatment would have no effect on the qualities that make the sites eligible for the National Register of Historic Places

Cumulative Effects: Noxious weeds could affect these sites if the invasive weeds affect soil stability at the sites. Erosion has the potential to affect the spatial and temporal relation of artifacts, which can in turn reduce the significance and information potential of sites. Thus far, this has not been a problem at known cultural sites. If the spread of noxious weeds accelerates, or if noxious weed populations become established at known historic or prehistoric sites and the level of weed treatment remains at the current level, this could adversely affect heritage resources.

This alternative should have no effect on historic or prehistoric cultural resources, with the caveat identified in the previous paragraph.

None of the alternatives would affect known cultural resource sites within the analysis area. No traditional plant gathering areas have been identified within the boundaries of areas proposed for treatment. Conversely, with no treatment, the continued spread of weeds has the potential to displace any native vegetation traditionally gathered. Additionally, with the change in vegetative cover and reduced soil stability, the spread of noxious weeds has the potential to increase site erosion, affecting the integrity and stability of historic and prehistoric cultural sites.

4.8 POSSIBLE CONFLICTS WITH OTHER PLANS AND POLICIES

Montana noxious weed laws direct County control authorities to make all reasonable efforts to develop and implement a noxious weed program. The lack of adequate weed control under the No Action Alternative (Alternative 3) and No Chemicals Alternative (Alternative 2) would conflict with these State and County weed control plans and policies. Alternative 1 indicates that the Forest Service is

committed to the management of noxious and undesirable weeds in the Beaverhead-Deerlodge National Forest.

None of the alternatives would conflict with State and Federal water or air quality regulations or with U.S. Fish and Wildlife Service recovery plans for threatened and endangered species. A biological assessment of potential effects of the preferred alternative to threatened and endangered species will be completed for the FEIS.

4.9 PROBABLE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

The application of herbicides in Alternatives 1 and 3 brings with it the likelihood of some unavoidable environmental impacts. As discussed, the impacts would primarily involve non-target plants. Although it is possible that minute amounts of herbicide would migrate from treatment sites, alternative design criteria would prevent environmentally significant concentrations of herbicide from reaching surface or groundwater. Thus, under reasonably foreseeable circumstances, there would be no significant environmental effects.

The adoption of Alternative 2, without herbicide application, would not immediately result in unavoidable environmental impacts. The continued spread of noxious weeds would eventually result in unavoidable environmental effects. Weed species considered naturalized in an area are very difficult to control. Visible examples are spotted knapweed infestations in many areas of western Montana.

Although considered naturalized in many locations, some areas remain relatively uninfested by spotted knapweed. Successful eradication of small populations of this species, and reduction of seed production in large populations, would slow its rate of spread and reduce its occurrence relative to other, more desired species. But when infestation levels increase to the point that it is not practical or economically feasible to control them, adverse environmental impacts are unavoidable.

4.10 RELATIONSHIP BETWEEN SHORT TERM USE AND LONG TERM PRODUCTIVITY

Implementation of the preferred alternative may result in the short-term loss of non-target species and localized biodiversity in areas where herbicides are used. However, the long-term effect is increased biodiversity for the Forest through the eradication of noxious weeds.

4.11 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Any action alternative would involve an irretrievable commitment of labor, fossil fuels, and economic resources.

4.12 CONSISTENCY WITH APPLICABLE FOREST PLAN STANDARDS

All alternatives are consistent with the applicable Forest Plan Standards identified in Chapter 3. There is no need to amend the Forest Plan.

Alternatives 1 and 3 aggressively control noxious weeds by allowing the majority of infestations to be treated and to best use the most effective range of integrated weed management techniques. Alternative 2 is consistent with the Forest Plan Standards but does not provide effective weed control

4.13 CONSISTENCY WITH OTHER FOREST SERVICE POLICY AND DIRECTION

Executive Order 12898 orders Federal Agencies to identify and address the issue of environmental justice, adverse human health and environmental effects of agency programs that disproportionately impact minority and low-income populations. It also directs agencies to consider patterns of subsistence hunting and fishing when an agency action may affect fish or wildlife.

Appendices Table

Beaverhead-Deerlodge National Forest

Contents of Sections

LIST OF PREPARERS

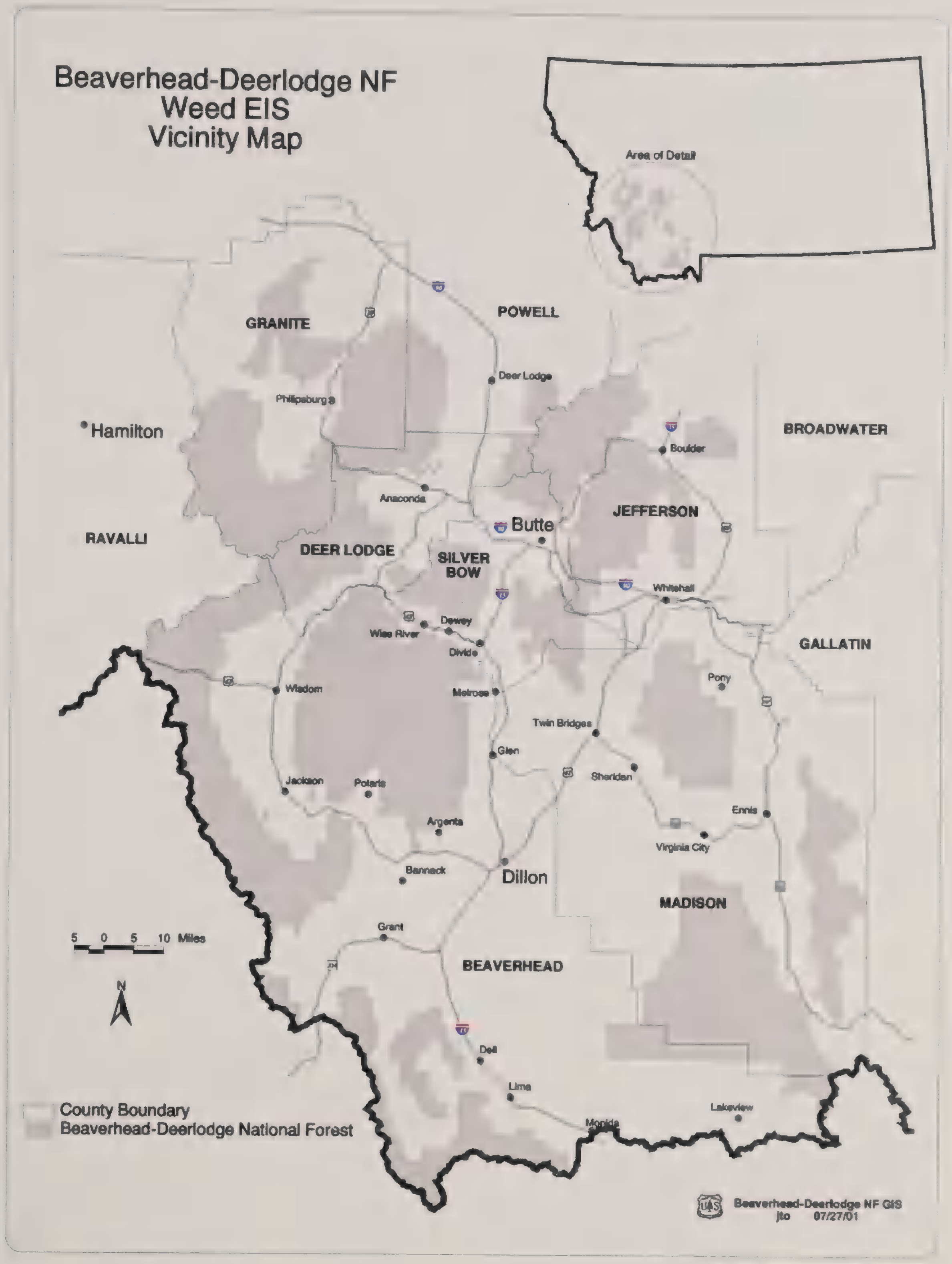
Responsibility	Interdisciplinary Team	Function
Final EIS Document	Leaf Magnuson	Team Leader & Writer / Editor
Human Environment	Don Despain	Rangeland Management Specialist
Vegetation	Kevin Suzuki	Rangeland Management Specialist
Aquatics	Jim Brammer	Fisheries Biologist
Water Quality	Pete Bengeyfield	Hydrologist
Wildlife	Ron Wiseman	Wildlife Biologist
Soil Resources	Dan Svoboda	Soil Scientist
Heritage Resources	Zane Fulbright	Archeologist
Maps	Tim O'Neill Jim McNamara	GIS Specialist GIS Specialist
Additional information	Garland Shaw	Pintlar RD Range Management Specialist
Additional information	Gil Gale	Wisdom RD Range Management Specialist
Additional information	Grant Godbolt	Butte RD Range Management Specialist
Additional information	Peter Smith	Dillon RD Resource Assistant
Additional information	Ron Gibson	Jefferson RD Range Management Specialist
Additional information	Dale McKnight	Wise River RD Resource Assistant
Additional information	Erick Tolf	Jefferson RD Resource Assistant
Additional information	Brad Weatherd	Dillon RD Range Management Specialist
Technical Support DEIS	Sherry Christensen	Executive Secretary

Appendix B

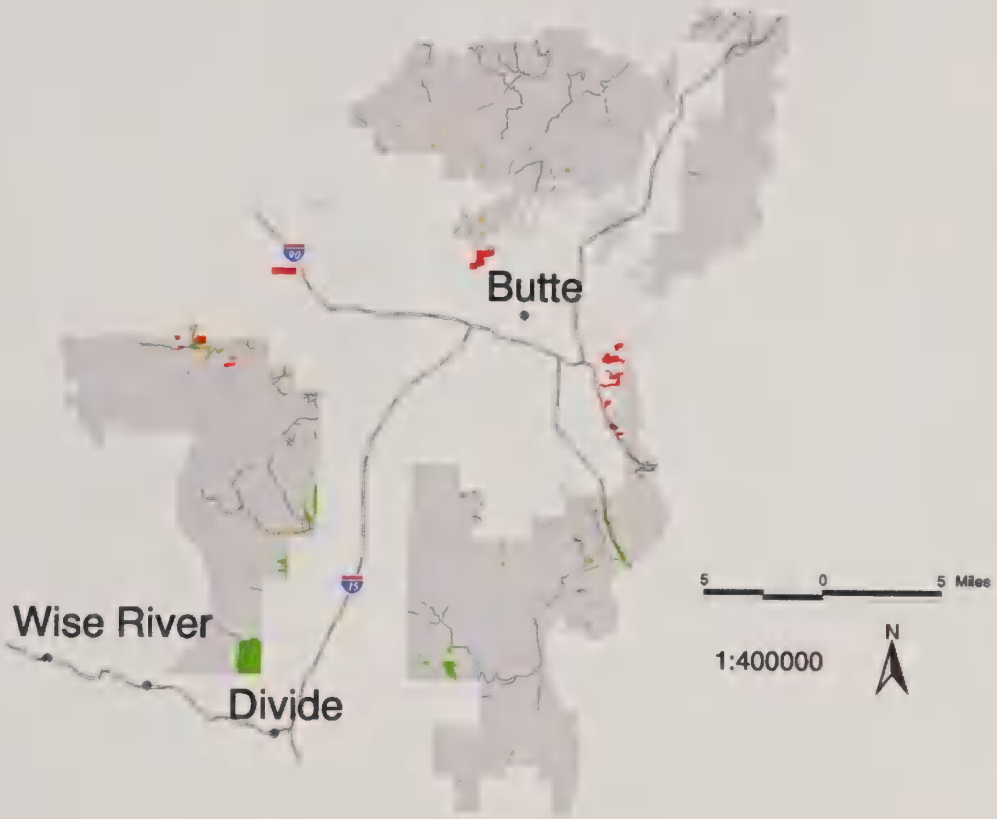
Beaverhead-Deerlodge National Forest

List of Maps in Order

1. Weed EIS Vicinity Map
2. Butte Ranger District Weed Infestation
3. Dillon Ranger District North Weed Infestation
4. Dillon Ranger District South Weed Infestation
5. Jefferson Ranger District Weed Infestation
6. Madison Ranger District North Weed Infestation
7. Madison Ranger District South Weed Infestation
8. Pintler Ranger District East Weed Infestation
9. Pintler Ranger District West Weed Infestation
10. Wisdom Ranger District Weed Infestation
11. Wise River Ranger District Weed Infestation
12. Cumulative Effects Analysis Area for all Resource Areas except Wildlife
13. Wildlife Cumulative Effects Analysis Area


Beaverhead-Deerlodge NF
Weed EIS
Vicinity Map
Area of Detail
GRANITE
POWELL
Deer Lodge
Philipsburg
Hamilton
BROADWATER
Boulder
Anaconda
JEFFERSON
Butte
RAVALLI
DEER LODGE
SILVER BOW
Whitehall
Dewey
Wise River
Divide
GALLATIN
Pony
Wisdom
Melrose
Twin Bridges
Glen
Sheridan
Jackson
Polaris
Ennis
Argenta
Virginia City
Bannack
Dillon
MADISON
5 0 5 10 Miles
Grant
BEAVERHEAD
N
Dell
Lima
Lakeview
Monida
County Boundary
Beaverhead-Deerlodge National Forest
Beaverhead-Deerlodge NF GIS
jto 07/27/01

Beaverhead-Deerlodge NF
Weed EIS
Butte Ranger District

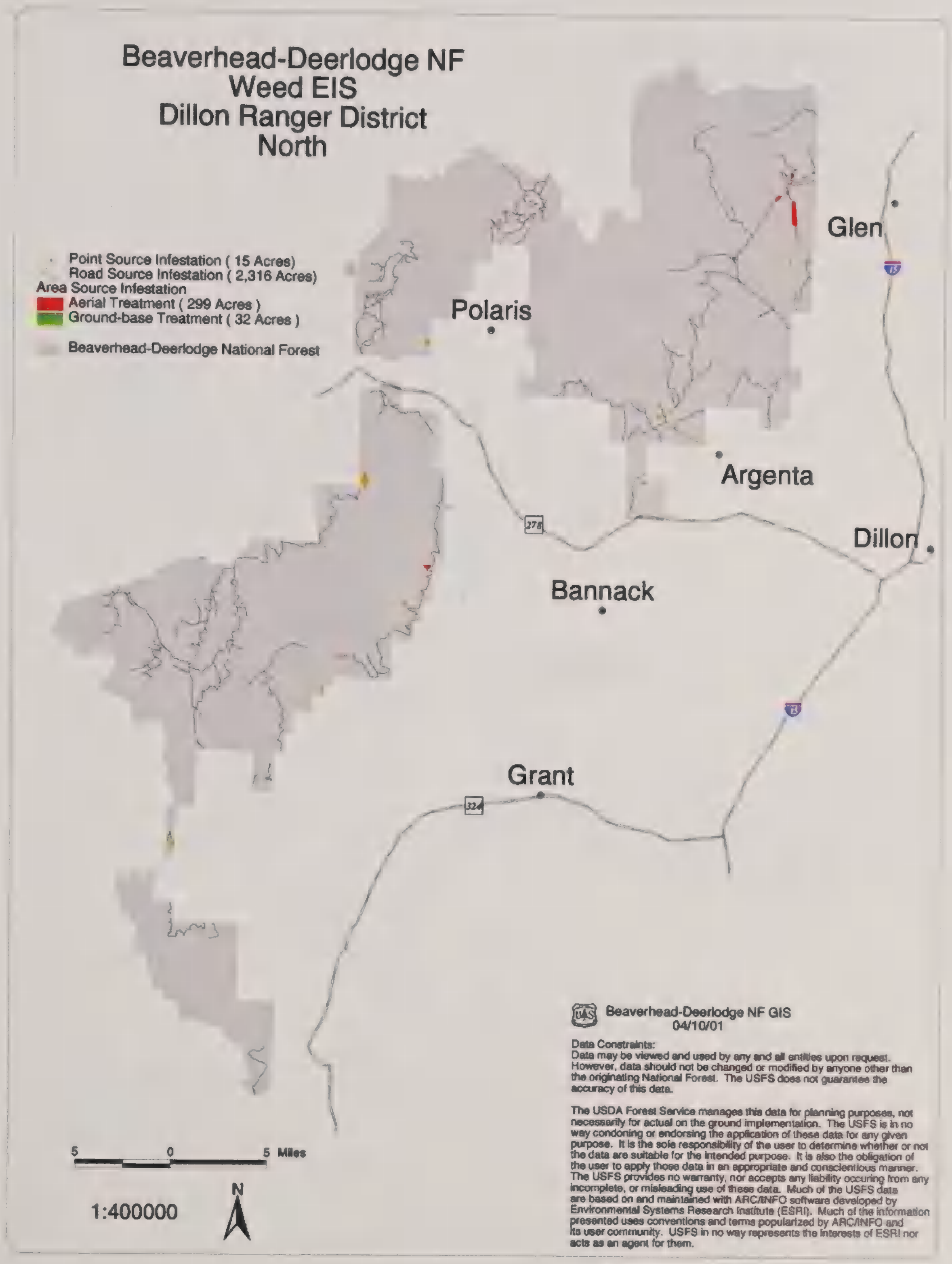


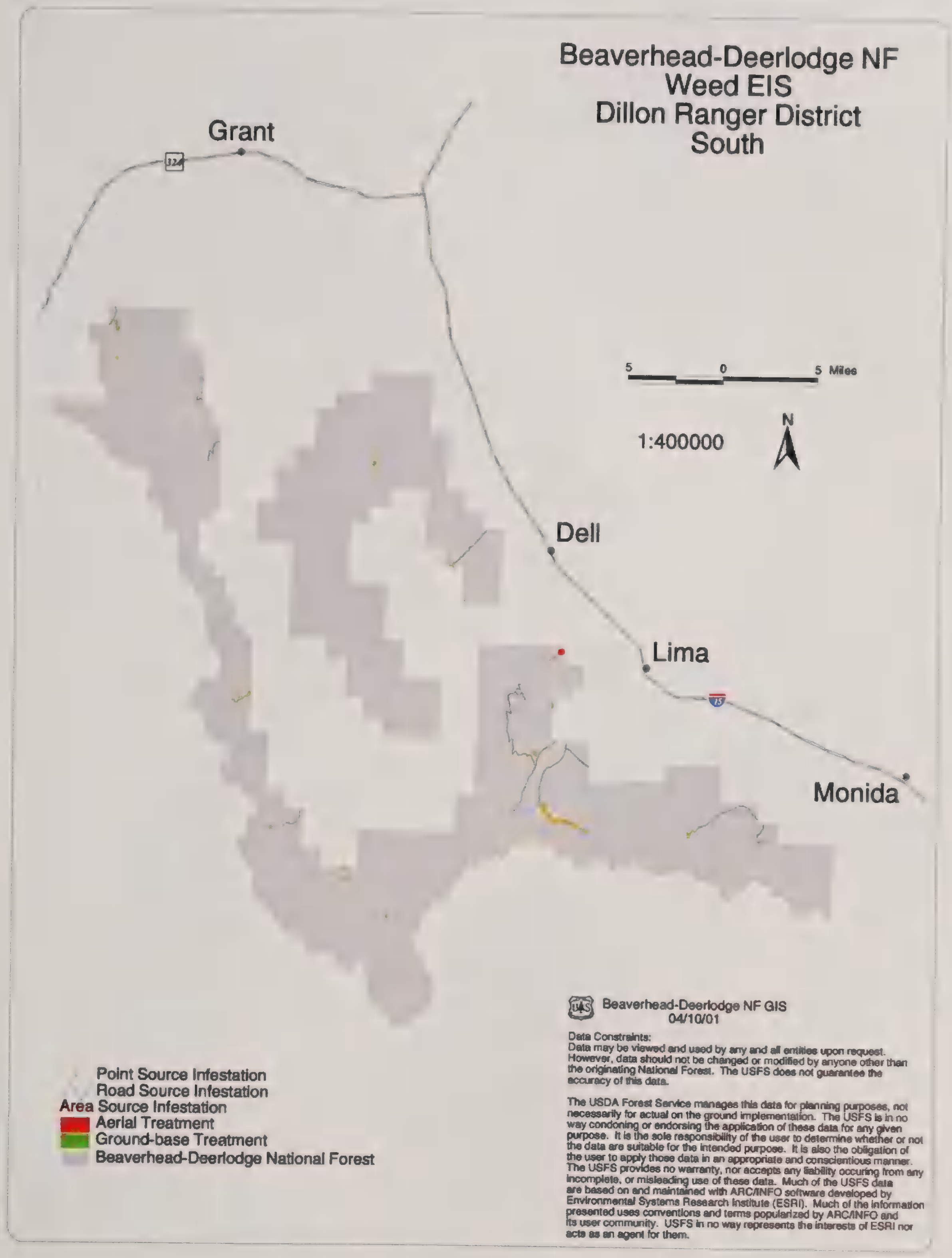
Point Source Infestation (20 Acres)
Road Source Infestation (763 Acres)
Area Source Infestation
Aerial Treatment (858 Acres)
Ground-base Treatment (1,827 Acres)
Beaverhead-Deerlodge National Forest

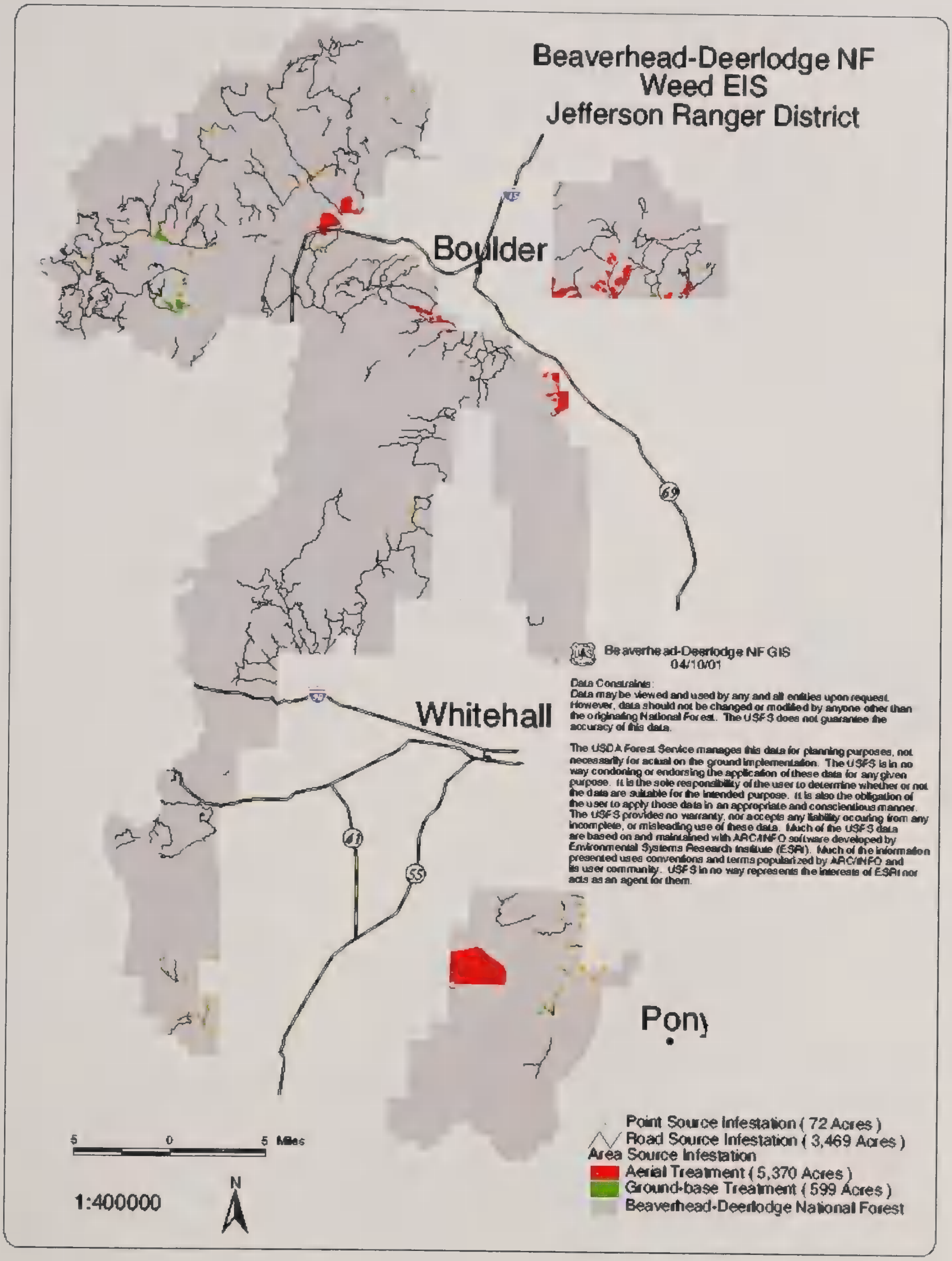
Beaverhead-Deerlodge NF GIS
04/10/01

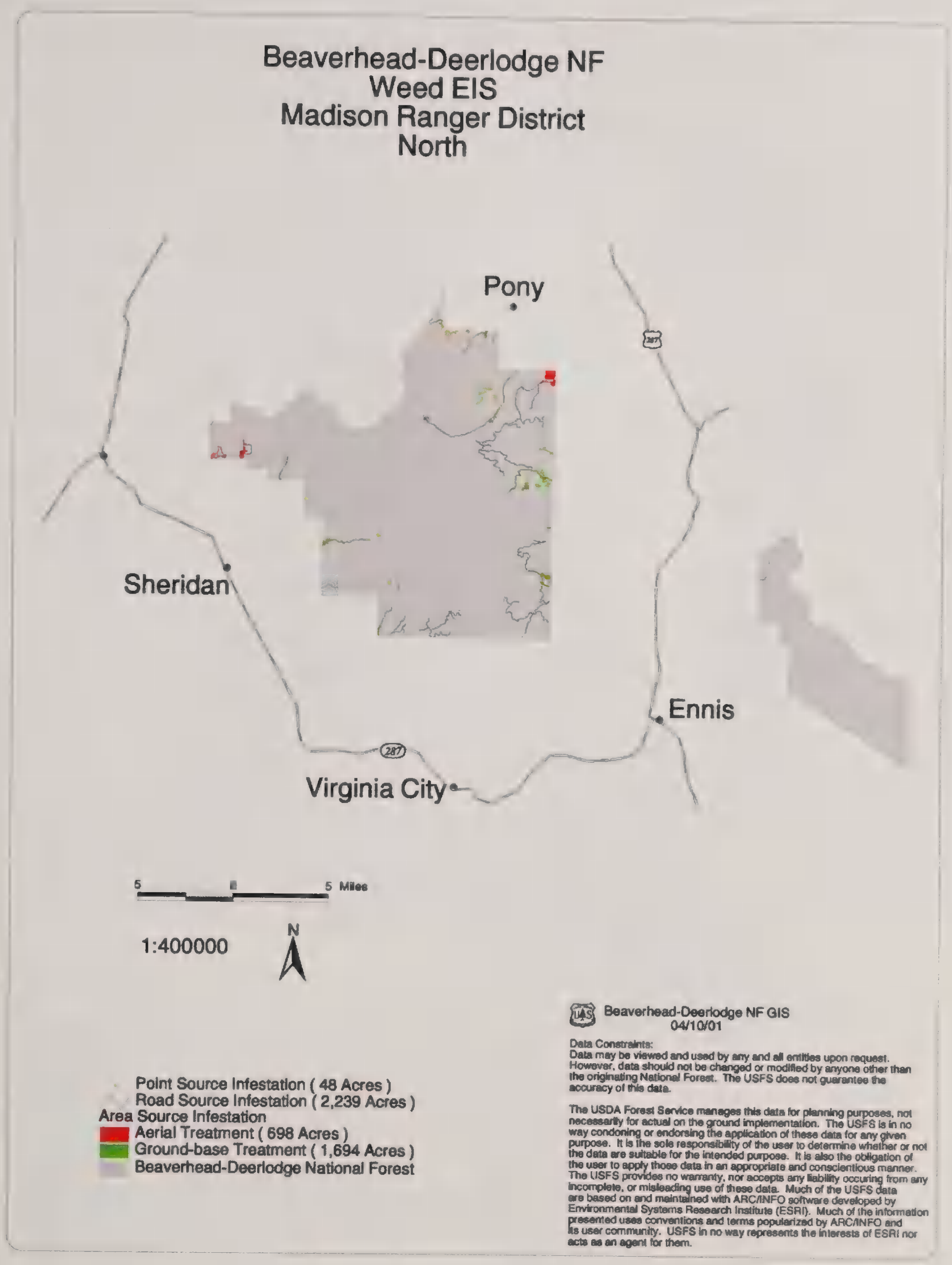
Data Constraints:
Data may be viewed and used by any and all entities upon request. However, data should not be changed or modified by anyone other than the originating National Forest. The USFS does not guarantee the accuracy of this data.

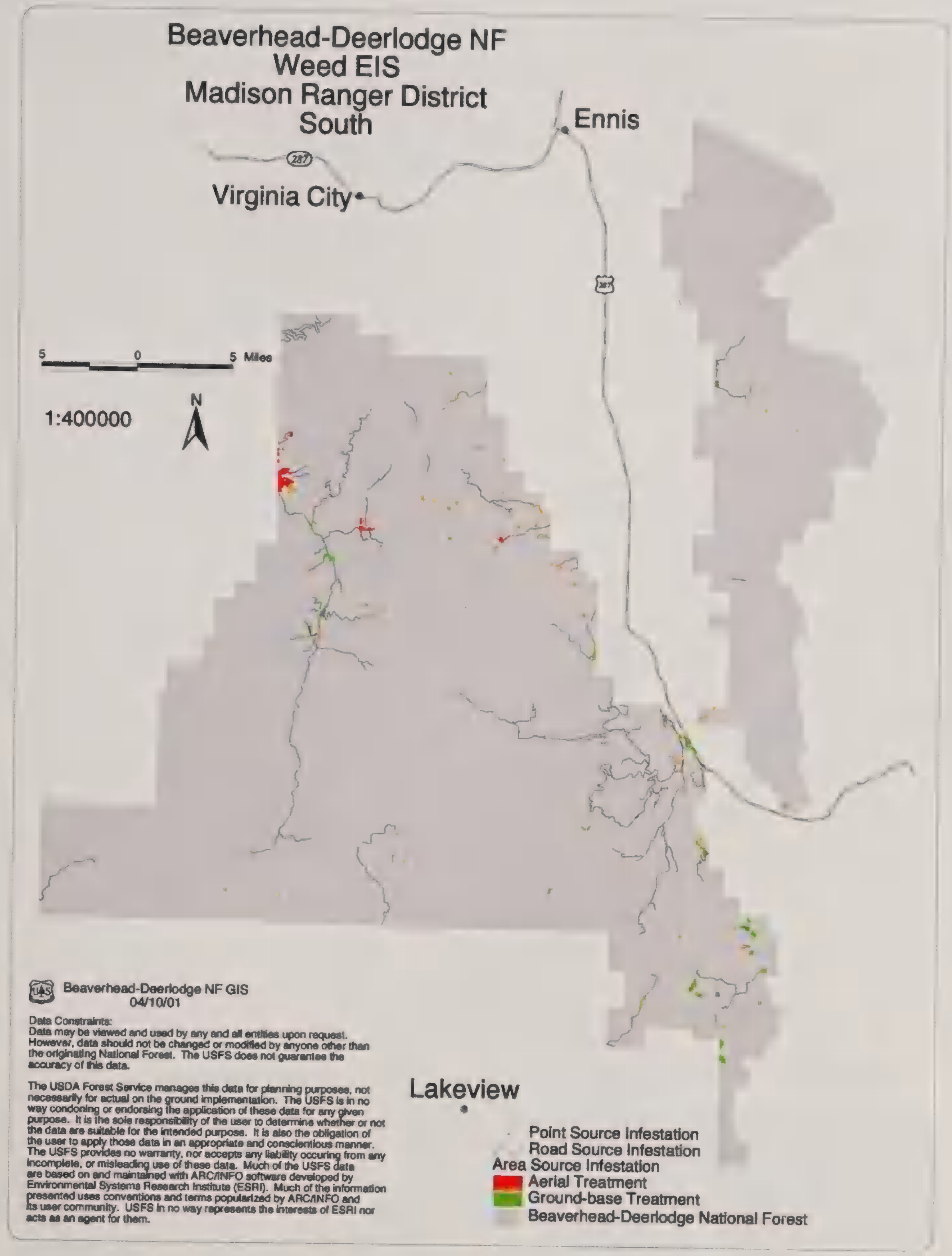
The USDA Forest Service manages this data for planning purposes, not necessarily for actual on the ground implementation. The USFS is in no way condoning or endorsing the application of these data for any given purpose. It is the sole responsibility of the user to determine whether or not the data are suitable for the intended purpose. It is also the obligation of the user to apply those data in an appropriate and conscientious manner. The USFS provides no warranty, nor accepts any liability occuring from any incomplete, or misleading use of these data. Much of the USFS data are based on and maintained with ARC/INFO software developed by Environmental Systems Research Institute (ESRI). Much of the information presented uses conventions and terms popularized by ARC/INFO and its user community. USFS in no way represents the interests of ESRI nor acts as an agent for them.

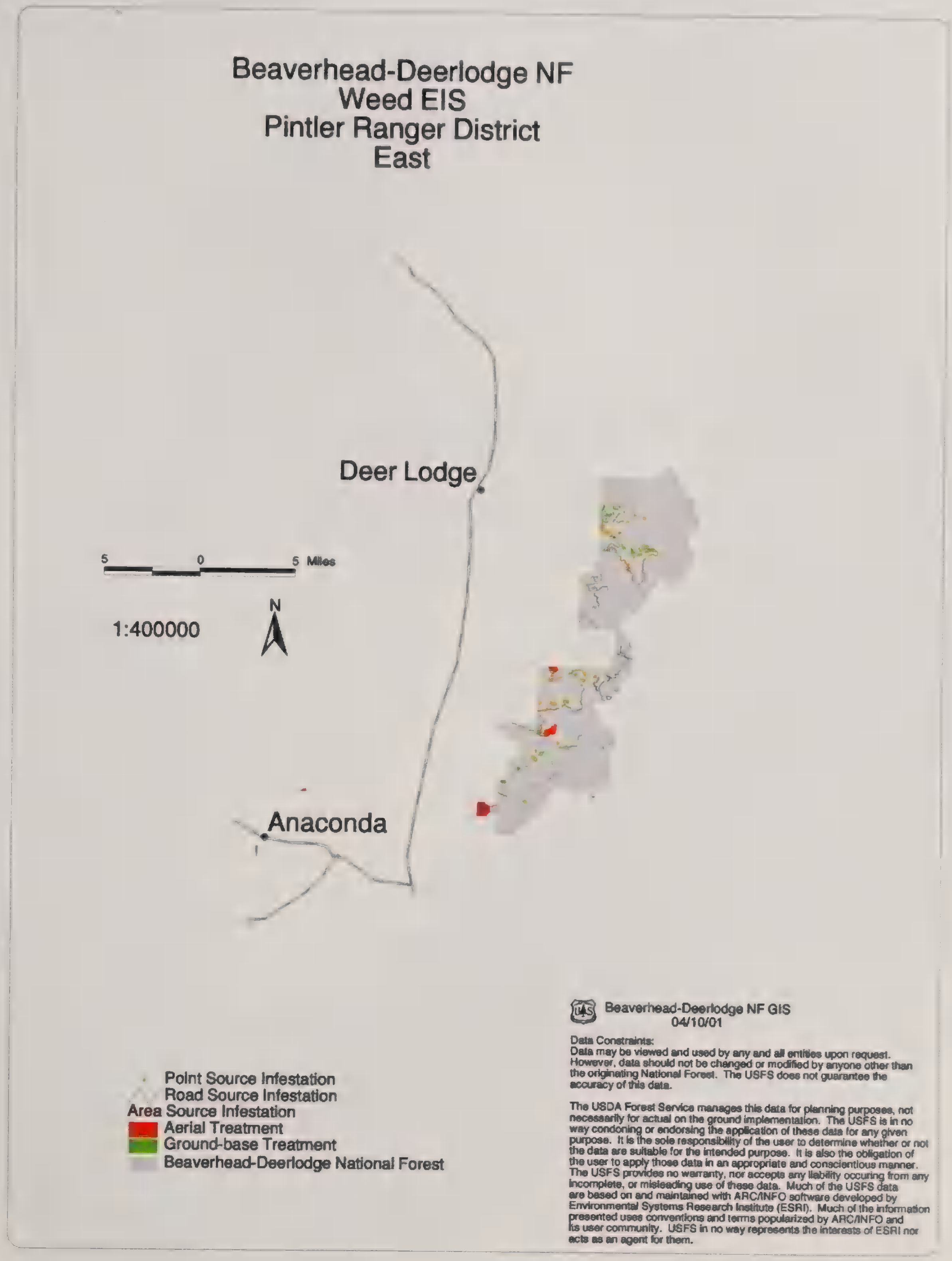

Beaverhead-Deerlodge NF
Weed EIS
Dillon Ranger District
North
Point Source Infestation (15 Acres)
Road Source Infestation (2,316 Acres)
Area Source Infestation
Aerial Treatment (299 Acres)
Ground-base Treatment (32 Acres)
Beaverhead-Deerlodge National Forest
Polaris
Glen
Argenta
Dillon
Bannack
Grant
278
324
15
5
0
5 Miles
1:400000
N
Beaverhead-Deerlodge NF GIS
04/10/01
Data Constraints:
Data may be viewed and used by any and all entities upon request. However, data should not be changed or modified by anyone other than the originating National Forest. The USFS does not guarantee the accuracy of this data.
The USDA Forest Service manages this data for planning purposes, not necessarily for actual on the ground implementation. The USFS is in no way condoning or endorsing the application of these data for any given purpose. It is the sole responsibility of the user to determine whether or not the data are suitable for the intended purpose. It is also the obligation of the user to apply those data in an appropriate and conscientious manner. The USFS provides no warranty, nor accepts any liability occuring from any incomplete, or misleading use of these data. Much of the USFS data are based on and maintained with ARC/INFO software developed by Environmental Systems Research Institute (ESRI). Much of the information presented uses conventions and terms popularized by ARC/INFO and its user community. USFS in no way represents the interests of ESRI nor acts as an agent for them.

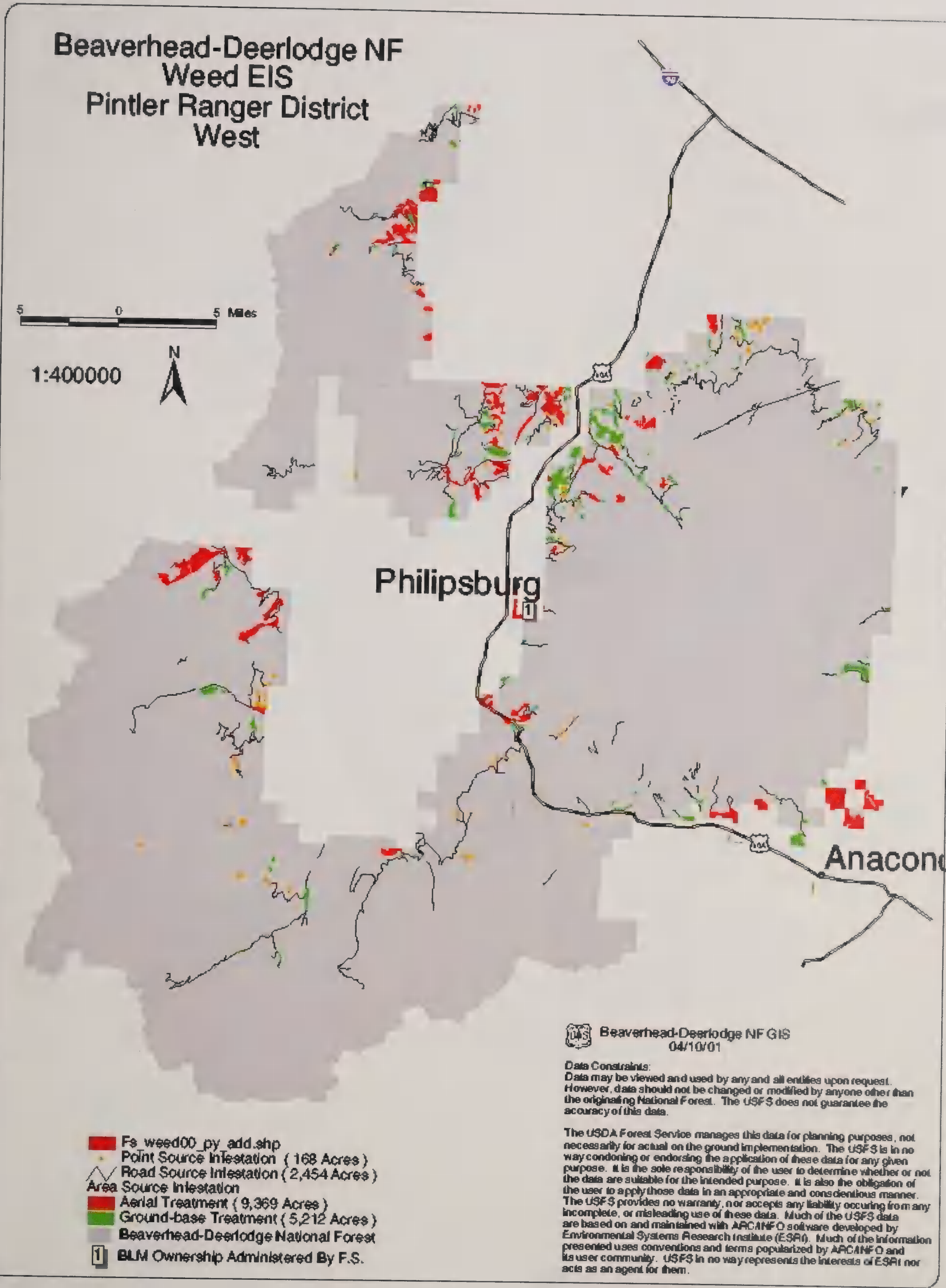

Beaverhead-Deerlodge NF
Weed EIS
Dillon Ranger District
South
Grant
324
5
0
5 Miles
1:400000
N
Dell
Lima
15
Monida
Point Source Infestation
Road Source Infestation
Area Source Infestation
Aerial Treatment
Ground-base Treatment
Beaverhead-Deerlodge National Forest
Beaverhead-Deerlodge NF GIS
04/10/01
Data Constraints:
Data may be viewed and used by any and all entities upon request. However, data should not be changed or modified by anyone other than the originating National Forest. The USFS does not guarantee the accuracy of this data.
The USDA Forest Service manages this data for planning purposes, not necessarily for actual on the ground implementation. The USFS is in no way condoning or endorsing the application of these data for any given purpose. It is the sole responsibility of the user to determine whether or not the data are suitable for the intended purpose. It is also the obligation of the user to apply those data in an appropriate and conscientious manner. The USFS provides no warranty, nor accepts any liability occuring from any incomplete, or misleading use of these data. Much of the USFS data are based on and maintained with ARC/INFO software developed by Environmental Systems Research Institute (ESRI). Much of the information presented uses conventions and terms popularized by ARC/INFO and its user community. USFS in no way represents the interests of ESRI nor acts as an agent for them.

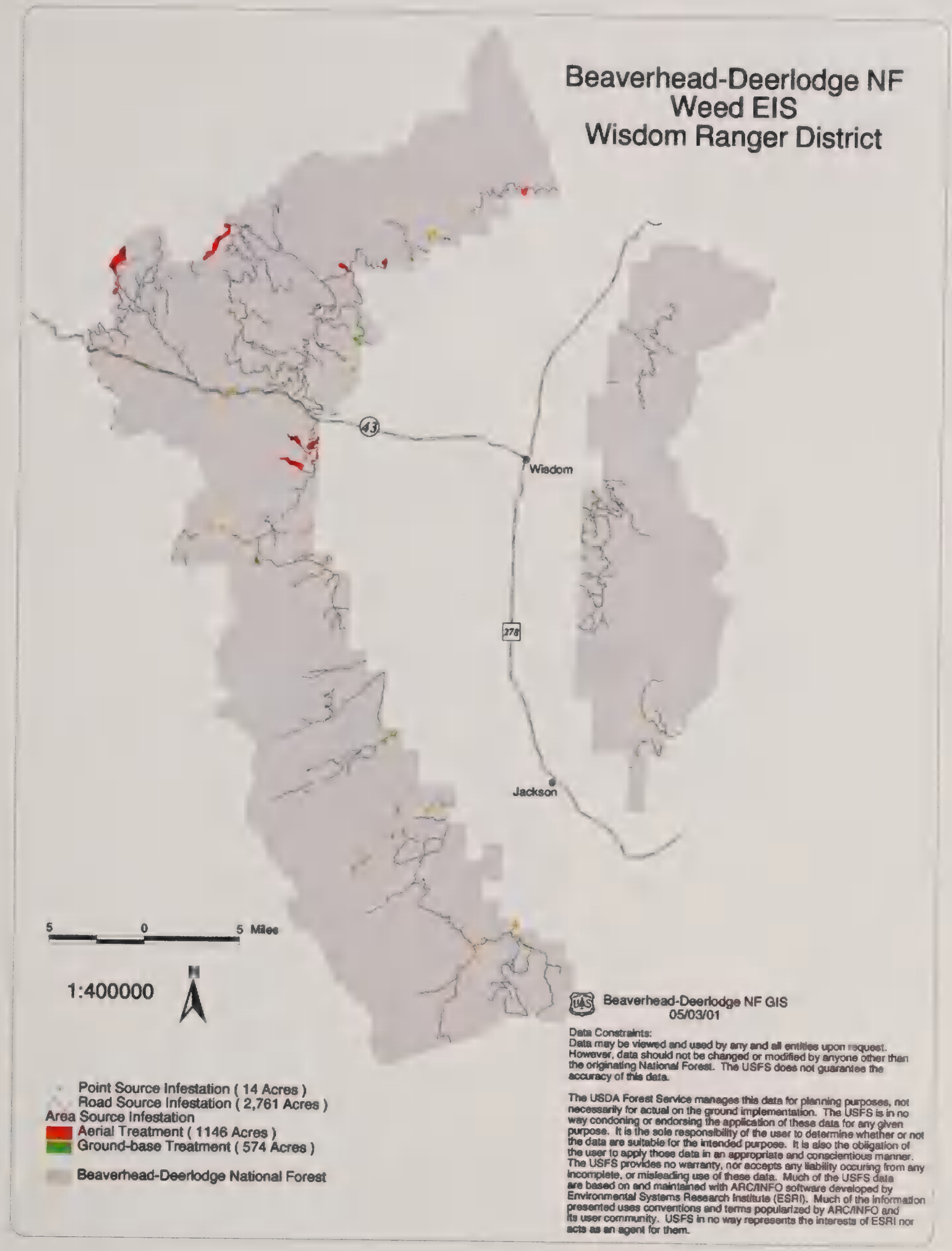

Beaverhead-Deerlodge NF
Weed EIS
Jefferson Ranger District
Boulder
Whitehall
Pony
69
55
Beaverhead-Deerlodge NF GIS
04/10/01
Data Constraints:
Data may be viewed and used by any and all entities upon request. However, data should not be changed or modified by anyone other than the originating National Forest. The USFS does not guarantee the accuracy of this data.
The USDA Forest Service manages this data for planning purposes, not necessarily for actual on the ground implementation. The USFS is in no way condoning or endorsing the application of these data for any given purpose. It is the sole responsibility of the user to determine whether or not the data are suitable for the intended purpose. It is also the obligation of the user to apply those data in an appropriate and conscientious manner. The USFS provides no warranty, nor accepts any liability occuring from any incomplete, or misleading use of these data. Much of the USFS data are based on and maintained with ARC/INFO software developed by Environmental Systems Research Institute (ESRI). Much of the information presented uses conventions and terms popularized by ARC/INFO and its user community. USFS in no way represents the interests of ESRI nor acts as an agent for them.
5 0 5 Miles
1:400000
N
Point Source Infestation (72 Acres)
Road Source Infestation (3,469 Acres)
Area Source Infestation
Aerial Treatment (5,370 Acres)
Ground-base Treatment (599 Acres)
Beaverhead-Deerlodge National Forest

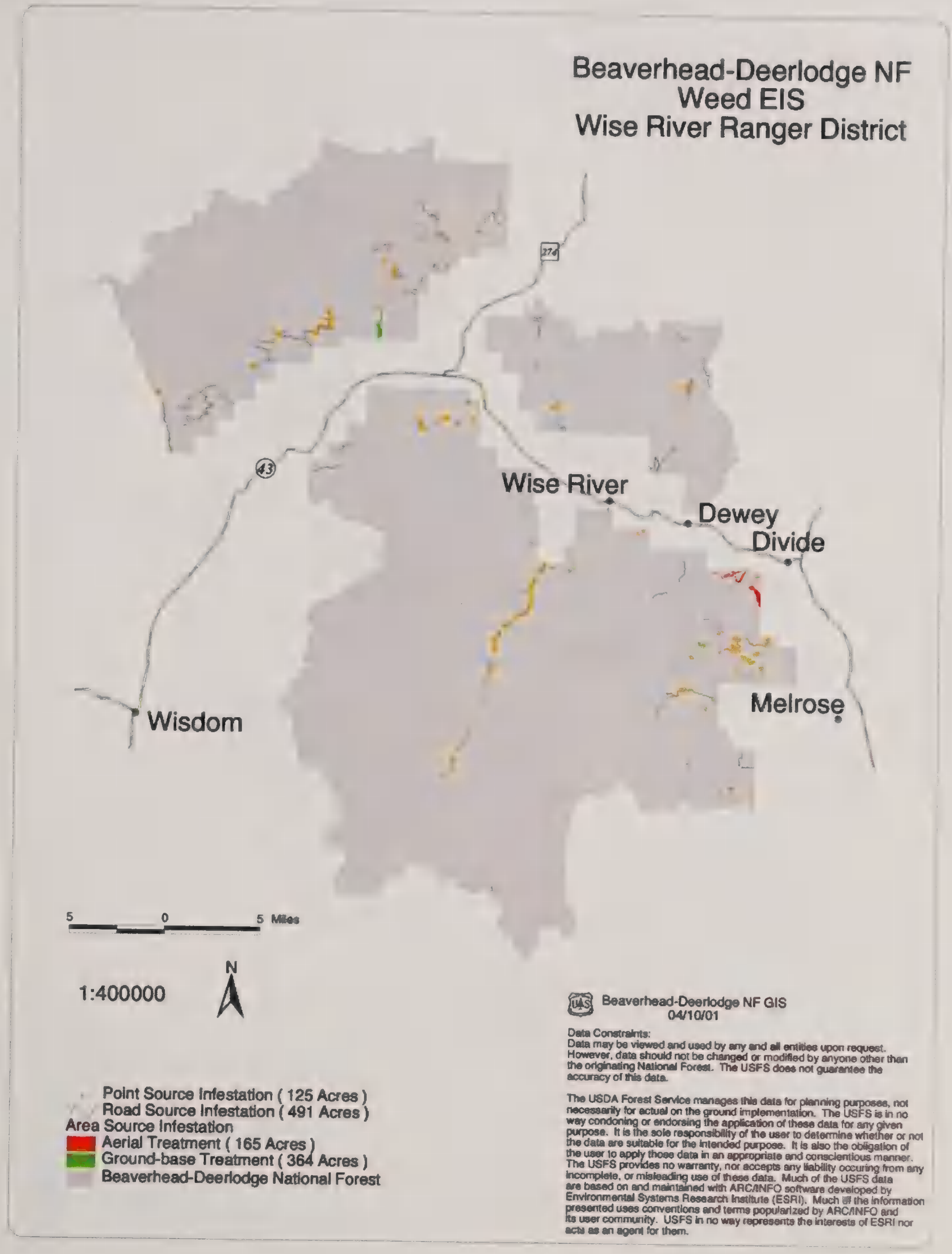

Beaverhead-Deerlodge NF
Weed EIS
Madison Ranger District
North
Pony
287
Sheridan
Ennis
287
Virginia City
5
0
5 Miles
1:400000
N
Point Source Infestation (48 Acres)
Road Source Infestation (2,239 Acres)
Area Source Infestation
Aerial Treatment (698 Acres)
Ground-base Treatment (1,694 Acres)
Beaverhead-Deerlodge National Forest
Beaverhead-Deerlodge NF GIS
04/10/01
Data Constraints:
Data may be viewed and used by any and all entities upon request. However, data should not be changed or modified by anyone other than the originating National Forest. The USFS does not guarantee the accuracy of this data.
The USDA Forest Service manages this data for planning purposes, not necessarily for actual on the ground implementation. The USFS is in no way condoning or endorsing the application of these data for any given purpose. It is the sole responsibility of the user to determine whether or not the data are suitable for the intended purpose. It is also the obligation of the user to apply those data in an appropriate and conscientious manner. The USFS provides no warranty, nor accepts any liability occuring from any incomplete, or misleading use of these data. Much of the USFS data are based on and maintained with ARC/INFO software developed by Environmental Systems Research Institute (ESRI). Much of the information presented uses conventions and terms popularized by ARC/INFO and its user community. USFS in no way represents the interests of ESRI nor acts as an agent for them.


Beaverhead-Deerlodge NF
Weed EIS
Madison Ranger District
South
Ennis
287
Virginia City
287
5 0 5 Miles
1:400000
N
Beaverhead-Deerlodge NF GIS
04/10/01
Data Constraints:
Data may be viewed and used by any and all entities upon request. However, data should not be changed or modified by anyone other than the originating National Forest. The USFS does not guarantee the accuracy of this data.
The USDA Forest Service manages this data for planning purposes, not necessarily for actual on the ground implementation. The USFS is in no way condoning or endorsing the application of these data for any given purpose. It is the sole responsibility of the user to determine whether or not the data are suitable for the intended purpose. It is also the obligation of the user to apply those data in an appropriate and conscientious manner. The USFS provides no warranty, nor accepts any liability occuring from any incomplete, or misleading use of these data. Much of the USFS data are based on and maintained with ARC/INFO software developed by Environmental Systems Research Institute (ESRI). Much of the information presented uses conventions and terms popularized by ARC/INFO and its user community. USFS in no way represents the interests of ESRI nor acts as an agent for them.
Lakeview
Point Source Infestation
Road Source Infestation
Area Source Infestation
Aerial Treatment
Ground-base Treatment
Beaverhead-Deerlodge National Forest


Beaverhead-Deerlodge NF
Weed EIS
Pintler Ranger District
East
Deer Lodge
Anaconda
5 0 5 Miles
1:400000
N
Point Source Infestation
Road Source Infestation
Area Source Infestation
Aerial Treatment
Ground-base Treatment
Beaverhead-Deerlodge National Forest
Beaverhead-Deerlodge NF GIS
04/10/01
Data Constraints:
Data may be viewed and used by any and all entities upon request. However, data should not be changed or modified by anyone other than the originating National Forest. The USFS does not guarantee the accuracy of this data.
The USDA Forest Service manages this data for planning purposes, not necessarily for actual on the ground implementation. The USFS is in no way condoning or endorsing the application of these data for any given purpose. It is the sole responsibility of the user to determine whether or not the data are suitable for the intended purpose. It is also the obligation of the user to apply those data in an appropriate and conscientious manner. The USFS provides no warranty, nor accepts any liability occuring from any incomplete, or misleading use of these data. Much of the USFS data are based on and maintained with ARC/INFO software developed by Environmental Systems Research Institute (ESRI). Much of the information presented uses conventions and terms popularized by ARC/INFO and its user community. USFS in no way represents the interests of ESRI nor acts as an agent for them.


Beaverhead-Deerlodge NF
Weed EIS
Pintler Ranger District
West
5
0
5 Miles
N
1:400000
Philipsburg
1
Anacond
Beaverhead-Deerlodge NF GIS
04/10/01
Data Constraints:
Data may be viewed and used by any and all entities upon request. However, data should not be changed or modified by anyone other than the originating National Forest. The USFS does not guarantee the accuracy of this data.
The USDA Forest Service manages this data for planning purposes, not necessarily for actual on the ground implementation. The USFS is in no way condoning or endorsing the application of these data for any given purpose. It is the sole responsibility of the user to determine whether or not the data are suitable for the intended purpose. It is also the obligation of the user to apply those data in an appropriate and conscientious manner. The USFS provides no warranty, nor accepts any liability occuring from any incomplete, or misleading use of these data. Much of the USFS data are based on and maintained with ARC/INFO software developed by Environmental Systems Research Institute (ESRI). Much of the information presented uses conventions and terms popularized by ARC/INFO and its user community. USFS in no way represents the interests of ESRI nor acts as an agent for them.
Fs_weed00_py_add.shp
Point Source Infestation (168 Acres)
Road Source Infestation (2,454 Acres)
Area Source Infestation
Aerial Treatment (9,369 Acres)
Ground-base Treatment (5,212 Acres)
Beaverhead-Deerlodge National Forest
1 BLM Ownership Administered By F.S.


Beaverhead-Deerlodge NF
Weed EIS
Wisdom Ranger District
43
Wisdom
278
Jackson
5
0
5 Miles
1:400000
N
Point Source Infestation (14 Acres)
Road Source Infestation (2,761 Acres)
Area Source Infestation
Aerial Treatment (1146 Acres)
Ground-base Treatment (574 Acres)
Beaverhead-Deerlodge National Forest
Beaverhead-Deerlodge NF GIS
05/03/01
Data Constraints:
Data may be viewed and used by any and all entities upon request. However, data should not be changed or modified by anyone other than the originating National Forest. The USFS does not guarantee the accuracy of this data.
The USDA Forest Service manages this data for planning purposes, not necessarily for actual on the ground implementation. The USFS is in no way condoning or endorsing the application of these data for any given purpose. It is the sole responsibility of the user to determine whether or not the data are suitable for the intended purpose. It is also the obligation of the user to apply those data in an appropriate and conscientious manner. The USFS provides no warranty, nor accepts any liability occuring from any incomplete, or misleading use of these data. Much of the USFS data are based on and maintained with ARC/INFO software developed by Environmental Systems Research Institute (ESRI). Much of the information presented uses conventions and terms popularized by ARC/INFO and its user community. USFS in no way represents the interests of ESRI nor acts as an agent for them.


Beaverhead-Deerlodge NF
Weed EIS
Wise River Ranger District
274
43
Wise River
Dewey
Divide
Melrose
Wisdom
5
0
5 Miles
1:400000
N
Beaverhead-Deerlodge NF GIS
04/10/01
Data Constraints:
Data may be viewed and used by any and all entities upon request. However, data should not be changed or modified by anyone other than the originating National Forest. The USFS does not guarantee the accuracy of this data.
The USDA Forest Service manages this data for planning purposes, not necessarily for actual on the ground implementation. The USFS is in no way condoning or endorsing the application of these data for any given purpose. It is the sole responsibility of the user to determine whether or not the data are suitable for the intended purpose. It is also the obligation of the user to apply those data in an appropriate and conscientious manner. The USFS provides no warranty, nor accepts any liability occuring from any incomplete, or misleading use of these data. Much of the USFS data are based on and maintained with ARC/INFO software developed by Environmental Systems Research Institute (ESRI). Much of the information presented uses conventions and terms popularized by ARC/INFO and its user community. USFS in no way represents the interests of ESRI nor acts as an agent for them.
Point Source Infestation (125 Acres)
Road Source Infestation (491 Acres)
Area Source Infestation
Aerial Treatment (165 Acres)
Ground-base Treatment (364 Acres)
Beaverhead-Deerlodge National Forest

Data Constraints:
Data may be viewed and used by any and all entities upon request. However, data should not be changed or modified by anyone other than the originating National Forest. The USFS does not guarantee the accuracy of this data.

The USDA Forest Service manages this data for planning purposes, not necessarily for actual on the ground implementation. The USFS is in no way condoning or endorsing the application of these data for any given purpose. It is the sole responsibility of the user to determine whether or not the data are suitable for the intended purpose. It is also the obligation of the user to apply those data in an appropriate and conscientious manner. The USFS provides no warranty, nor accepts any liability occuring from any incomplete, or misleading use of these data. Much of the USFS data are based on and maintained with ARC/INFO software developed by Environmental Systems Research Institute (ESRI). Much of the information presented uses conventions and terms popularized by ARC/INFO and its user community. USFS in no way represents the interests of ESRI nor acts as an agent for them.


Beaverhead-Deerlodge NF
Weed EIS
Wildlife Cummulative Effects Analysis
Hamilton
Philipsburg
Deer Lodge
Boulder
Anaconda
Butte
Whitehall
Dewey
Wise River
Divide
Wisdom
Melrose
Pony
Twin Bridges
Glen
Sheridan
Jackson
Polaris
Ennis
Argenta
Virginia City
Bannack
Dillon
Grant
Dell
Lima
Monida
Lakeview
Data Constraints:
Data may be viewed and used by any and all entities upon request. However, data should not be changed or modified by anyone other than the originating National Forest. The USFS does not guarantee the accuracy of this data.
The USDA Forest Service manages this data for planning purposes, not necessarily for actual on the ground implementation. The USFS is in no way condoning or endorsing the application of these data for any given purpose. It is the sole responsibility of the user to determine whether or not the data are suitable for the intended purpose. It is also the obligation of the user to apply those data in an appropriate and conscientious manner. The USFS provides no warranty, nor accepts any liability occuring from any incomplete, or misleading use of these data. Much of the USFS data are based on and maintained with ARC/INFO software developed by Environmental Systems Research Institute (ESRI). Much of the information presented uses conventions and terms popularized by ARC/INFO and its user community. USFS in no way represents the interests of ESRI nor acts as an agent for them.
Wildlife Cummulative Effects Boundary
Beaverhead-Deerlodge National Forest
5 0 5 10 Miles
N
Beaverhead-Deerlodge NF GIS
jto 07/27/01

List to Whom Copies of the FEIS Have Been Provided

Federal Agencies
Advisory Council on Historic Preservation,
BLM Montana/Dakota State Office
Butte & Dillon Offices
Interstate Commerce Commission
National Park Service
Natural Resources Conservation Service
Natural Resources Conservation Service,
NW Division Department of Defense
Region VIII EPA
US Department of Agriculture
US Department of the Interior
US Army Corps of Engineers. NWD
US Environmental Protection Agency
USDA APHIS,
USFS Ecosystem Management
USFS Northern Region

Tribes
Confederated Salish-Kootenai
Shoshone-Bannock

Montana State Agencies
EPA, Helena, MT
Montana Department of Agriculture
Montana Fish Wildlife & Parks
Montana State University
State Historic Preservation Office

Libraries
Dillon Public Library
Drummond Public Library
Madison Valley Public Library
Mansfield Public Library, UofM
Montana State Library
Philipsburg Pubic Library
Renne Library, MSU
Sheridan Public Library
Twin Bridges Public Library
USDA National Agricultural Library

Counties

Anaconda Deerlodge County
Beaverhead County Commission
Beaverhead County Resource Use Committee
Beaverhead County Weed District
Butte-Silverbow County
Deerlodge County
Granite County Commission
Granite County Extension Office
Jefferson County Commission
Madison County Commission
Madison-Jefferson Extension
Park County Extension Office
Powell County Commission
Powell County Weed Control

Businesses and Organizations

Alliance for the Wild Rockies
American Fisheries Society
American Wildlands
Backcountry Horsemen of Missoula
Backcountry Horsemen of California
Bar 7 Ranch
Big Hole River Foundation
Boulder River Sportsmens Club
Californians for Alternative to Toxics
Carlson Ranch Limited Partnership
Centennial Livestock
Chuck Bowey Ranch Resources
Concerned Citizens of Pony
Deerlodge Forest Defense Fund
Dell Bacon Ranch Co.
Discovery Ski Area

Beaverhead-Deerlodge National Forest

East Pioneer Experimental Stewardship Program
Ecological Consulting
Elkhorn Ranch
Elser & Sons Ranch, Inc.
Five Valleys Land Trust
Friends of the Bitterroot, Inc.
Germann Ranch
Granger Ranches
Hamilton Ranches Partnership
Headwaters RC&D
Headwaters RC&D Area Inc.
High Country Discovery
High Mountain Ranches, Inc.
Hildreth Livestock
Hirschy Livestock, Inc
Holland Ranch
Hollowtop Outdoor Primitive School
Huntsman Ranch Co.
J. Dwight Harrison Ranch
Johns Ranch, Inc
LH Ranch
L-H Ranch
Lower Rock Creek Weed District
LR Huckaba Ranch Inc & West Fork Stock Assn.
Mark Clemow Ranches, I c
Maxim Technologies, Inc.
Montana 4 Wheel Drive Assoc.
Montana Snowmobile Assn.
Montana Weed Control Association
Montana Weed control Association
Montana Wilderness Association
MTA Investment Company
Myers Trust
Native Ecosystems Council
Paul T. Smith Ranches, Inc.
Ranch Resources L.L.C.
Rebish and Helle Partnership
Resource Concepts
Simpson, Thacher & Bartlett
Sky Top Ranch, Inc
Skyline Sportsmen's Assn.
Smith 6 Bar S Livestock
Snowline Grazing Assn.
Stender Ranch, Inc
The Ecology Center Inc.
The Nature Conservancy of Montana
Tomahawk Ranch
Turner Enterprises, Inc.
Ueland Ranches, Inc
Upper Canyon Outfitting
Wade Lake Resort
Walsh& Diablo Mesa Ranches
Westech
Western Environmental Trade Assn.
XC Ranch, Inc
Z4 Ranch Company

INDIVIDUALS

Alverson, Bill & Pat
Blomquist, Emmett
Boomer, Alan
Boulter, David
Bruce, Louise
Cain, Bill & Catherine
Campbell, Larry
Chatriand, Louis
Chelini, Joe
Chirico, Paul
Church, Brian
Clark-Nelson, Pauline E.
Coe, Clarence S.
Compton, Gene
Costello, James
Craddock, Bill
Crenshaw, Bill
Dinger, Marilynn
Donnelly, Barbi & Tom
Dowden, William L.
Durham, Ken & Ramona
Durnin, Patrick J.
Erickson, Jack
Erickson, Jack & Linda
Fay, Tim
Fix, Roger & Joyce
Funston, Jerry
Haigh, June G.

Beaverhead-Deerlodge National Forest

Hilmo, Ron
Hilton, Richard
Hubber, Roy
Huntley, Clayton
Jackson, Daniel C.
Jackson, Peter V. III
Jackson, Ward
Jackson, William
Johnson, Sara
Kambich, Mark
Keil, Josine M.
Kromm, Cynthia
Kujala, Quentin
Kulla, Andy
Laknar, Larry
Maciag, Steven E.
Magnus, John
Malyevac, Gray
Matinell, Allen
McCoy, Jack & Anna
McDougal, Graeme & Beverly
McKee, Paul
McNair, Doug & Bev
Melle, Richard & Debbie
Mieger, Michael D.
Mulligan, Tim
Murphy, Joe
Neill, Marian
Nelson, Dirk
Nelson, Gary
Nicholas, Connie
Oaas, Knute Hans
Ochenski, George
Olson, Steve
Osborn, Ed
Pallister, Phillip
Peltier, Josecph
Peters, Roger
Peterson, Bruce & Julie
Peterson, Randy & Susan
Rachlis, Sandra
Rand, Doug
Reck, Bob
Reed, Dean & Barbara
Rodewald, Bob & Deena
Rodowicz, Mr & Mrs. Eugene
Rupel, Ed
Schemm, George
Schiedermayer, Gene
Selyem, Ursala
Sherick, John
Shores, Karen
Sims, Paul G.
Sloan Temple
Smith, Maynard
Stanford, Leah
Stede, Sharon
Stratton, Frank
Stroops, Ed
Sweet, Kathleen A.
Syrjala, Edward S.
Terry, Rick & Lynn
Thompson, Sheila
Tomich, Robert
Verlanic, Joseph & Sheila
Webb, Charlotte
Zimmerman, Dan

PUBLIC PARTICIPATION

The Public Participation Phase for this EIS began with scoping in the spring of 1999. The fires of 2000 caused a year of delay and the process moved forward in the spring of 2001.

Weed EIS listed in the Quarterly Project List, 4/1/99

Notice of Intent to prepare an Environmental Impact Statement: 8/9/99

Notice of availability of Scoping Package to Forest mailing list: 5/1/99

Public scoping letter: 8/2/99

Content Analysis of scoping comments: Revised 5/14/01.

Draft EIS published and mailed with a request for comments, August 13, 2001.

Comments on the Draft were analyzed and incorporated into the Final EIS. The Team Leader met or called those who provided substantive comments. A record of those conversations is contained in the project file. Changes made in the Final EIS reflect the concerns expressed by members of the Public and other agencies. A summary of concerns and the responses are listed in Appendix E.

The Final EIS was released with the Record of Decision in May 2002.

Public Concern List

This table reflects substantive comments and the responses. A synthesis of comments or a representative direct quote is used to frame the concern. Concerns are cross-referenced to one or more respondents listed at the end.

	Concern	Response
	Purpose & Need	
1	Management should be left to the local ranger and weed team, people on the ground are better able to understand the area and its problem (9).	District Rangers and field staff will be making decisions under the guidance of this Noxious Weed Control Program
2	The spread of noxious weeds is increased by extractive resource activities at the expense of highly valued, existing forest resources. The EIS needs to thoroughly disclose and analyze necessary changes in the way "business" is done in managing the B-D Forest's resources so as to not further cause the spread of noxious weeds, which then causes still more proposals to treat with toxic chemicals." (3)	This comment is directed at a Forest Plan level issue and is out of the scope of this decision document. The recently adopted Best Management Practices apply to all commercial activities on the Forest to reduce and prevent weed spread. The BMPS are supplied in Appendix H.
	Range of Alternatives	
3	How was it determined that simply increasing the mechanical and biological treatments by multiplying them by ten was going to address the current needs of the forest while utilizing all available resources other than chemical applications (12)?	Please refer to the economic analysis in Chapter 2, provided in response to your request for a meaning full economic analysis. The explanation for the acres identified in Alternative 2 acres is just before the estimated cost comparison chart on page 2-7.
4	Aerial spraying presents real and unresolved dangers to native ecosystems. In this vein, we believe that the DEIS could have gone much further when considering "reasonable alternatives" that employ substantially fewer aerial spray applications while still treating a significant number of acres (12).	Please refer to Alternatives Considered But Not Given Detailed Study on page 2-8.
5	It would have been useful for the DEIS to have analyzed an alternative that treated as many acres as possible with backpack spraying in areas that were targeted for aerial application. While the costs are obviously different, the potential negative environmental effect of aerial spraying could be avoided with such an alternative. The public and the decision-maker deserve to see the relative advantages and disadvantages to such an approach (12).	Potential effects were addressed in Chapter 4-21 and 22. Aerial spraying causes much less disruption than ground application. Some of the areas proposed for aerial spray are too steep for crews with backpack sprayers to treat safely. By using appropriate herbicides and following label directions negative effects are mitigated. Please refer to Alternatives Considered But Not Given Detailed Study on page 2-8.

	Concern	Response
6	The lack of reasonable alternatives is a weakness in the DEIS that pervades the analysis of every single resource. The choice the decision maker is presented is an action alternative that will kill the most weeds while degrading other resources through chemical contamination or an action alternative that will allow weeds to spread throughout the BDNF unattended. This is not a true range of reasonable alternative according to APA (Administrative Procedures Act) or the Forest Service Handbook (3 &12).	The mid-range alternative between the no chemical treatment (Alternative 2) and the Proposed Action (Alternative 1) is the No-Action Alternative (Alternative 3). Alternative 3 describes no change from existing weed control, which uses ground applied herbicide. Please refer to sections 2.3 Alternatives Considered in Detail, and 2.5 Please refer to Alternatives Considered But Not Given Detailed Study in Chapter 2.
7	The BDNF has not met its requirements under the APA by failing to consider other reasonable and viable alternatives to implement the weed control project (12).	The analysis was conducted in accordance with all Federal policies, regulations and guidelines. See Laws and Regulations on page 3-2.
8	To us it would seem particularly useful to analyze an alternative that provided a 300-500 foot buffer around all water bodies and wetlands from chemicals, and address the areas in the buffer with mechanical, hand-pulling while taking extra measures to protect water quality (12).	The preferred alternative was modified to include all open water under a standard aerial spray buffer of 300 feet. Mitigation is included to protect water quality and aquatic species. Please begin reading on page 2-13
9	We believe than an action alternative must address chronic weed vectors by tying them directly to a specific action (12 & 3).	In conversation with the authors of this concern it appears chronic vectors mean vehicle use on National Forest. Changes in Forest Travel Plans are out of the scope of this decision. The Decision to be Made (page 1-6,) addresses the scope of the decision. The OHV amendment (page 1-3,) and BMPs (Appendix H), address weed spread by off-highway vehicles and forest management activities respectively.
	<u>Economics</u>	
10	"By failing to present any sort of economic analysis, it is impossible to determine the best course of action from this DEIS . . . While appendix E provides comparative costs of weed control methods, it is impossible to ascertain how much it costs to use biological methods annually for each alternative. . . . This is of special concern as economics were the reason that one alternative identified by the ID team was not fully developed (12).	The economic analysis was revised to show a relative Costs per Acre and begins on page 2-6.

	Wildlife / Livestock / Biocontrol	
11	We did not see much emphasis placed on biological control. We are aware of places in Montana that use sheep and goats to control weeds for a cost of approximately $0.60 an acre. We recommend that the Forest explore this method of weed control to a greater extent (1). .	The Forest does not use sheep or goats for weed control at this time. This does not rule them out in any alternatives where appropriate. See Appendix I for the history of biological control on the Forest included in response to your comments on the Draft EIS.
12	Many of the affected areas area grazed by livestock, which may significantly impact the effectiveness of toxic chemicals. An alternative should be considered that discontinues livestock grazing in sprayed areas for some years to assist in the recovery of native plants, and to prevent the possibility of herbicides from entering the human food chain (3).	Grazing doesn't change the effectiveness of herbicide because weeds are generally unpalatable to livestock. In the case of a large scale spray treatment, coordination with the permittee takes place to adjust the pasture rotation or grazing schedule to comply with label specifications. In the case of dense infestations, rest from grazing may be a viable option to allow for recovery of native species and is managed under Annual Operating Instructions for the Term Grazing Permits. Most treatments in pastures are spot treatments and chances for herbicides to enter the food chain are low. To discontinue grazing outside of grazing permit parameters would be in conflict with provisions for economic support to local communities in Forest Plans. Changes to grazing policy are out of scope because it is a Forest Plan level decision.
13	Appendix H provides grazing management goals and practices. Under Goal 2, grazing practice 5, it says that pastures should be closed to livestock grazing when the pastures are infested to the degree that livestock grazing will continue to either exacerbate the condition on site or contribute to weed seed spread. Designate those pastures as unsuitable range until weed infestations are controlled. Goal 3, grazing practice 7 includes consideration of practices to minimize wildlife grazing on restoration areas. If a pasture is to be closed under Goal 2, grazing practice 5, then monitoring and control of wildlife in that pasture should also occur (5).	Wildlife generally do not feed in the same concentrations as cows and therefore do not require regulation. In addition, wildlife control is under the jurisdiction of Montana Fish, Wildlife and Parks, and therefore out of the scope of this decision.

14	If livestock management is a preventive measure, wildlife management should also quality as a preventive measure. At least a portion of the money generated by grazing fees is utilized to address the noxious weed problem (BNFP, page II-9). A similar approach should be taken with wildlife (5 & 2).	The response to concern #13 above, also applies here.
15	Sites selected for biocontrol application must be protected from other management actions that could negatively influence the biocontrol agent. These sites can also function as collection points for redistribution . . . to other sites (11).	This is true and is included in the analysis. Appendix I contains a history of biological control practices.
	Weed Spread	
16	The alternatives to not directly address the identifiable vectors of weed spread, such as recreational and commercial transportation. (12 & 3).	Changes in Forest Travel Plans are out of the scope of this decision. The OHV amendment (page 1-3) and BMPs (Appendix H), address those vectors.
	Transportation Related Comments	
17	Will the B-D be able to control weed spread and improve degraded resource conditions in targeted spray areas as long as motorized vehicles continue to use those areas? An alternative should be developed that closes impacted areas to motorized vehicles. (3)	Changes in Forest Travel Plan decisions are out of the scope of this document. However, we continue to provide and support prevention and education to reduce weed spread by vehicle operators.
18	Many of the affected areas are located along Forest Service roads. An alternative should be developed that closes roads in affected areas. (3)	Changes in Forest Travel Plans are out of the scope of this decision. See the Decision to be Made section on page 1-6.
19	The DEIS does not contain any detailed proposal to restrict off-road vehicle use. Doing so would help eliminate a source of weed spread on the Forest and reduce need for chemical treatment. It would seem logical to identify the specific acreage where OHV use has contributed to weed spread and address this by limited use (12 & 8).	The Decision to be Made section on page 1-6 makes a clear statement "this decision will not deal with, 1) changes in wildfire management, 2) travel, road use and access, and 3) changing land use and Forest management objectives. The OHV amendment (page 1-3 and the BMPs (section 2.5.4), address weed spread by off-highway vehicles and forest management activities respectively

20	Why are changes in travel, road use, and access outside the scope of this proposal? How does this DEIS change current travel access in areas sensitive to weed infestation? Has the BDNF investigated the effectiveness of current BMPs? All of the mitigation in Appendix H is currently in use on the forest and yet weed populations are expected to "increase rapidly" unless we spray the forest with herbicides (12).	This proposal involves weed treatment not travel management, which is a separate Forest Plan level issue because of myriad issues involved with vehicle access. Please refer to the response above The BMPs were implemented in 2000 and will take time to prove effective. The rapid weed increase is projected because some areas would be left untreated under Alternatives 2 and 3.
	Chemical Control	
21	The DEIS appears to limit the acreages proposed for direct control of weeds. If funding is available in a given year to control more weeds than shown in a given alternative, the Forest should be able to do so (1, 6, 5, 7, & 10)	When monitoring reports show we are treating more than 16019 acres annually we will review the program under NEPA to determine if additional acres of weeds should be treated.
22	We encourage the Forest Service to recognize and treat any new species of noxious weeds and to use new chemicals if they are determined to be more effective (4, 5, 6, 9 & 10)	The control of new noxious weed species and use of new herbicides is an important part of Alternative 1. Please refer to Section 2.3.1 on page 2-2.
	Application Criteria and Methodology	
23	Page 1-3 states that aerial spraying of chemical herbicides would be used if determined to be appropriate for the site. What criteria will be used to determine whether aerial application is appropriate? We recommend that the Forest should develop a list of criteria to be used to determine whether aerial application is appropriate. (1).	In response to your comment, selection methods for aerial application sites are described on page 2-5.
24	"All areas to be aerially sprayed should be flagged to minimize the area that is sprayed, prevent spray application to incorrect sites, and increase the safety for the pilot by eliminating the pilot's need to study contour maps while operating the helicopter. There should also be a person on the ground close to the spray site maintaining radio contact with the pilot. The flagging should be visible to the pilot from whatever altitude he is flying" (11).	Appropriate methodology will be applied to achieve objectives and minimize risk to resources as required under the Forest aviation plan.
25	Herbicide specimen labels and material safety data sheets should be included in the appendix. Information should also be included regarding the situation or condition in which each particular herbicide active ingredient will be applied, . . . Use of dyes should lesson the chance of under-treatment or over-application, and help monitor drift (11).	Please begin reading on page 2-2 for a description of herbicide use under Alternative 1.

26	The Forest uses methods that extensively disturb the ground, and does not respond to new weed occurrences in a timely manor utilizing physical/mechanical methods (3).	Mitigation for ground disturbance by forest practices is outlined in the Best Management Practices recently adopted region-wide, detailed in Appendix H.
27	We note that spotted knapweed is the predominant noxious weed species, found on 78% of the noxious weed infestations on the Forest (page 3-8). We note that spotted knapweed is non-rhizomatous and should be relatively easy to control with lower rates of the most selective low toxicity herbicides (11).	The typo was corrected and it is 77% of weed infestation. This is true. We use the application rate recommended on the label and spotted knapweed does take a lower rate than, for example, leafy spurge.
	Site Specific Information	
28	The DEIS should provide detailed site-specific information by ranger district for each proposed treatment site including sensitive water, species and features in treatment areas.	The size of the BDNF requires large-scale maps for this EIS. Site specific information is available upon request from the respective districts. See page 3-25 for a table of Water Quality Limited Streams.
	Toxicity	
29	"The DEIS does not disclose how much herbicide reapplication (by ground or air) will likely be necessary. This is important because some areas would receive multiple herbicide applications, and have an increased potential for adverse impacts on non-target plants, wildlife, watershed, fish, and other aquatic life forms." (3).	This plan does not specify which areas will get repeated treatment with herbicides because it depends on the effectiveness of initial treatments and continued monitoring. The discussion of effects in the Fisheries and Water Quality begins on page 4-11 and addresses these concerns,
30	The conclusions reached in the pesticide fact sheets listed on page 2-10 either demonstrate that we do not know much about the effects of these chemicals or that they are toxic to native ecosystems. While we realize that aerial spraying of herbicides represents the quickest and easiest method of targeting inaccessible weed populations, we are extremely concerned that the Forest is overlooking the potential long-term harm that these toxic chemicals will cause. We also assert that the DEIS misrepresents come of the conclusions reached through testing of these chemicals (12).	Please see Chapter 2 for detailed information about the proposal Aerial spray is limited to less than .2% of infested acres. The impacts of not treating weeds is much more certain than the risk of impact of herbicide use. We are indeed concerned about chronic effects. The Forest Service participates in current research by several federal agencies. This EIS does not preclude changes in herbicide use should these studies determine negative chronic effects. Mitigation for herbicide treatment begins on page 2-13.
31	There is not a single chemical or herbicide listed that could be considered benign in its effect on the environment. Nearly all of the herbicides listed have the potential to pollute groundwater and surface water (12).	The impacts of herbicides are discussed in the EIS and in great detail in the Biological Assessments and Evaluations in Appendix M. These concerns are also reflected in Mitigation on page 2-13.

32	All of the herbicides kill non-target native plants . . . Seven of the 12 listed herbicides were at least moderately toxic to fish while tests on amphibians had not been completed for most chemicals. Nearly all of the herbicides being considered have not been tested for chronic effects to terrestrial species while others were deemed to be toxic to birds, insects, and humans . . . Many of the herbicides remain active and toxic in the soil for over a year after application, some up to 3 years . . . we are surprised that as species are in decline all over the world because of toxic contamination our national forests are proposing to apply toxic chemicals on a landscape scale by spraying them out of an airplane (12).	Mitigation (page 2-13), has been changed in response to your concerns, to include a field inspector to monitor for drift and compliance with label instructions. The 300-foot buffer now includes all open water, not just streams with T&E species. Aerial application has only been proposed on 9028 acres, less than .2% of the total 43,000 acres on infestation. Fisheries, BLM, FWS and FS are currently researching studies for chronic effects, largely on anadromous species. If the studies find that we need to make changes to protect aquatic resources we will.
33	These known effects of herbicides mandate that an alternative that relies less on chemicals while treating remote infestations be re-evaluated (12).	Existing treatment involves herbicides. An increase of less than half of a percent of BDNF lands is involved in the proposed action. The no herbicide alternative addresses this concern, (Page 2-5).
34	The DEIS made an unsupportable claim regarding the airborne by-products of herbicides when ignited. Nine out of 11 pesticides were listed in the DEIS as having "no information available" to determine the effects of burning treated vegetation and potential airborne by-products, yet the DEIS on page 4-1 claims that "None of the herbicides currently registered for wildland weed control are known to produce airborne by-products from burning treated vegetation in amounts that are hazardous to human health." The DEIS is not revealing the same data and information listed on the USDA pesticide fact sheets (12).	Human health risks from volatized herbicides in smoke are analyzed in the Risk Assessment for Herbicide Use in Forest Service Regions 1, 2, 3, 4, and 10 and on Bonneville Power Administration Sites referred to in Chapter 2 of the FEIS (http://www.fs.fed.us/foresthealth/pesticide/health.htm). Inhalation of airborne concentrations of herbicides, that could be applied prior to prescribed burning (or wildfire), was compared to the limits for each herbicide. In all cases, the comparison indicated a negligible risk from inhalation. The cancer risk from picloram (most often used) was less than 1 in 1 million.
35	The DEIS and USDA pesticide fact sheets contradict each other. The DEIS claims that "while there are exceptions, most herbicides disappear quickly from both the ground surface and soil," and indicates that Clopyralid is the most selective, meaning it would have the least impact on non-target vegetation. The fact sheets indicate that Clopyralid can remain in the soil for up to a year depending on soil type (12).	Persistence of an herbicide in the ground and herbicide selectivity, are not the same thing. Because an herbicide may stay in the soil up to a year does not mean it will kill more non-target species, especially more selective herbicides. Persistence affects how often an area needs to be treated. A persistent herbicide, such as picloram, allows treatment every other year, or longer, to get sufficient control. Persistence varies between herbicides from half a year up to 2 or 3 years Please refer to Figure 2.1 on page 2-4 and the fisheries section of Appendix M.

36	The fact sheet for picloram provides a good example of the toxicity of the chemicals that are being proposed. It stays active in the soil for over a year; it has the potential to pollute ground and surface water; there is "insufficient information" to determine the by-products produced through burning; it is highly toxic to non-target species of plans, moderately toxic to aquatic species, not tested for the chronic effects on terrestrial species; toxic to threatened, endangered, and sensitive species of plants; and causes skin and eye irritation to humans. We are not convinced that this is a chemical that the Forest Service should be applying to public lands. Refer to the research enclosed by Mary O'Brien. She cites testing performed on cutthroat trout. In addition, fifteen thousand pounds of hatchery trout were killed by picloram being used to combat spotted knapweed near Sheridan, Montana, in July of 1989. The EPA reporting and labeling requirements result in inadequate warnings about the toxicity of picloram. It has absolutely no place in the watershed (12).	Information we've gathered about the fish kill related to hatchery trout near Sheridan Montana (Dick Oswald, Montana Fish, Wildlife & Parks, personal interview) indicated picloram was applied by a private operator, to dry tanks or raceways, which were then filled with water and fish. This is basically equivalent to the direct application of herbicide to a fish-bearing stream; which is outside label directions and out of compliance with the mitigation measures identified on page 2-13. The respondent was not able to provide citations for the O'Brien assertions. The O'Brien articles submitted in both comment periods emphasize Forest Service reliance on herbicide and question knowledge of the herbicides used. Please refer to the description of Alternative 1 (page 2-2). We use aerial application with all other methods to best protect BDNF lands from weed infestation. Issues related to inadequate warnings under EPA reporting and labeling requirements outside the scope of this document. New research or information will be evaluated as it becomes available.
37	The chemical 2,4-D has been correlated with lethargy in rainbow trout, and an increase in downstream movement (which) can reduce the ability of the fish to avoid predators and slow migration towards spawning grounds. Pine trees that have had 2,4-D applied experience more frequent infestations of Armillaria root rot. In addition, 2,4-D and the dioxins and other contaminants it contains is both acutely and chronically toxic. In humans, it is a neurotoxin, a carcinogen, and adversely affects reproduction. The first legal judgment in the U.S. that linked 2,4-D to cancer was made in 1987. A Texas jury concluded that a U.S. F.S. employee's fatal malignant lymphoma was linked to his exposure to Tordon 101 while working in Oregon (12).	The U.S. EPA registers picloram; we use it according to label directions and have used it systematically since 1986. In addition to label directions for application we include the mitigation discussed on page 2-13 to protect fisheries and water quality. Issues related to inadequate warnings under EPA reporting and labeling requirements regarding the toxicity of 2,4-D are outside the scope of this document and should be addressed with the EPA. New research or information will be evaluated as it becomes available. Two websites for herbicide risks are provided on page 2-3.

	Aquatic Resources	
37	The mitigation measures should be clarified on page 2-11 for bull trout and west slope cutthroat trout to insure that ground and hand application of chemicals is acceptable within the 300 foot buffer for bull trout and west slope cutthroat trout, and the 100 foot buffer for sport fisheries streams (1).	The primary potential for water quality contamination to occur to the extent that could harm aquatic species seems primarily to be through aerial application. Mitigation to prevent these effects is listed on page 2-13. and is further discussed in the Biological Evaluation and Assessment for fisheries in Appendix M This document precludes direct application of herbicides to water bodies, but hand application of herbicides, approved for use in riparian areas will occur. See page 2-4 for the decision process for weed treatment in riparian zones.
39	We recommend that all potable, agricultural, and recreational uses of surface and ground water immediately downstream or down gradient from proposed herbicide application areas be clearly disclosed and evaluated for potential effects from herbicide applications. Identification of these areas will assist herbicide applicators in understanding which streams should have special precautions taken to avoid transport of herbicides to streams, and thus avoid impacts to water quality and fisheries (11).	Mitigation is directed at immediate area protection. No cumulative effects are anticipated for fisheries and water quality. A diagram of the decision process that applies to weed treatment in riparian zones is available in Figure 4-4 at the end of Chapter 4. Applicators will follow label specifications which are based on EPA testing and standards which we must assume are adequate.
40	A 300-foot buffer (rather than 100 feet) should be maintained between all open water containing fisheries, and any aerial herbicide application (not just bull trout and west slope cutthroat trout), as well as for any streams up-gradient of public water supplies. A 100-foot buffer may not be wide enough during aerial application to avoid drift of herbicide to riparian areas and streams. (11 & 12)	In response to concerns about all aquatic species the buffer was changed to 300 feet for all open water. A field inspector will be on-site during aerial spray operations to monitor drift using spray cards as described on page 2-13.
41	Only treatment methods that target individual noxious weed plants should be done in riparian and wetland areas. The herbicide application technique of hand or manual wipe-on (especially when applying contact systemic herbicides such as glyphosate) is not mentioned as an option to control individual plants up to the existing water level adjacent to streams or sensitive aquatic sites (11).	In this document "wipe-on" application is called "wick" application. You'll find it toward the end of the section titled direct and indirect effects to rare and native plant species that begins on page 4-4. Please also see the mitigation section that begins on page 2-13.
42	It should be unequivocally stated that no herbicide spraying will occur in or near streams and wetlands or other aquatic areas (seeps, springs, etc.) Herbicide drift into these areas could adversely affect aquatic life and wetland functions (11).	Please see Figure 2-3.1 on page 2-4 for determining treatment in riparian zones. During aerial spray operations the mitigation section beginning on page 2-13 includes a 300 foot buffer and on-site monitoring for drift by a field inspector.

43	The DEIS indicates that aerial herbicide application near stream, ponds, or wetlands will only occur when winds are 10 mph or less and blowing away from these areas (page 2-11). The Lolo Weed EIS uses 6 mph. We recommend the use of 6 mph since it will reduce the potential for drift of toxic herbicides to aquatic areas (11).	The 10 mph was taken from risk assessment studies but we support your suggestion and the change was made on page 2-14.
44	The EIS should provide information regarding herbicide toxicity, aqueous mobility, and the risk of leaching of herbicides to ground water in treatment areas (or projects tiered to this EIS should provide this information). We are most concerned about leaching to ground water in areas with highly permeable, sandy gravelly soil with high or perched ground water tables. (11)	The RAVE model results (Soil Resources, section 4.8.1, page 4-22), suggest that only valley bottom flood plain situations have values (77) that "trigger the use of alternative chemicals with lower leaching potential through soil." No sites identified for herbicide use have threshold values above 80, which "trigger a method other than chemical treatment."
45	Not only should aerial application be restricted around watersheds that support Bull trout and cutthroat trout, it should be restricted from all watersheds (500 foot buffer). Amphibians seem particularly at risk from toxic contamination resulting from aerial application. Since very little testing of toxicity on amphibians has occurred, we do not agree with the DEIS claim that it is, "unlikely there will be significant direct effects to fisheries or amphibians" DEIS 4-17. There is no data available to support this claim in regards to amphibians (12).	Research indicates amphibians display sensitivity to certain chemicals. Maxell recommends a 100-foot buffer. It is plausible some herbicides proposed for use, could impact amphibians. There is little information available about the extent of potential impact, or situations that may cause harm and may be greater when herbicides are applied aerially than by hand to individual plants. Because of this, the buffer for aerial application near streams regardless of the species of inhabitant was extended from 100 to 300 feet. Additional mitigation was added for Western toads on page 2-15. Toads and salamanders most commonly occur in riparian areas and more inclusive buffers are intended to reduce the risk to sensitive amphibians. See Chapter 4, and the Fisheries BA in Appendix M for detailed discussion.
46	Page 3-22 states that the Forest is concerned about sediment and turbidity from a variety of activities. The document sites Lacey's work regarding increases in runoff and sedimentation from spotted knapweed, and acknowledges an increase in sedimentation from weed infestations under Alternative 2. Is the Forest concerned about the existing sedimentation caused by current weed infestations (1)?	Under the existing weed control plans, (no action alternative), some infestations are left untreated because of staff and budget restrictions in addition to inaccessible terrain. At this point sedimentation is low. Without treatment, however, weeds will increase and sedimentation will increase with weed population growth. See Soil Resources page 4-25.
47	The regulations in the DEIS of non-spray buffer zones adjacent to streams should be adequate to protect water quality (2).	The no-aerial spray buffer zones were increased to 300 feet for open water to provide more protection for amphibians in riparian areas. Mitigation discussion begins on page 2-13.

48	We believe that the effects analysis for water-quality and fisheries needs to go beyond a conclusion that chemicals and herbicides such as picloram are harmful to aquatic species and aerial application may cause contamination. We were able to ascertain this from the fact sheet. The EIS should provide information on how these agents would affect particular areas and resources on the Forest. For example, how many native fish do you expect to be impacted by each alternative and where? Table 4.1.4-2 reveals that alternative 1 may impact cutthroat trout, boreal toad, and northern leopard frogs, but we do not know where this is, or how the Forest determined this. We ask that you try to be more specific with your analysis conclusions to help us understand the impacts of each alternative more clearly (12).	Random movements by organisms; individual tolerances; behavioral tendencies; complexities in nature; endless geologic, vegetative and community variations between sites and an infinite potential for all these factors to interact prevent an analysis that addresses and answers the question of how many individuals will be impacted by each alternative. Mitigation measures (page 2-13 thru 15) were increased to ensure herbicide application would not have significant effects on water quality and sensitive species. The EIS states the fact that there may be risks as you stated. However, any proposed herbicide treatment will follow label direction. Additional mitigation will protect fish and amphibians. Please review the Biological Assessment which contains extensive detail about potential effects from picloram, in Appendix M.
49	The EIS should demonstrate that any projects will not result in further degradation of 303(d) listed waters. The EIS should describe the consistency of the proposed weed control program with MT Water Quality Standards, and demonstrate compliance with all applicable standards, including nondegradation and antidegradation. The EIS should provide a basis to judge whether water quality parameters and aquatic habitat will be kept at levels that will protect and fully support designated uses and meet WQS. The Forest should contact the MDEQ to verify listed waterbodies as impaired or threatened. The EIS should identify the specific impairment for listed waterbodies, and describe how the proposed project might affect these parameters (e.g. toxics). The Forest should also contact MDEQ to ensure TMDL requirements are adequately addressed (11).	The discussion concerning water quality is on page 3-23, "Effects on WQLS Watersheds" in the FEIS and in Mitigation Measures beginning on page 2-13. Generally, WQLS watersheds will not be affected because the beneficial uses (aquatic life forms and cold water fisheries) will not be affected. The toxicity of herbicide applied according to label instructions is not great enough to either directly harm aquatic organisms on site or accumulate downstream in organisms. Mitigation measures described will ensure the application process is carried out responsibly.
50	The Forest Service should develop a monitoring program to show that mitigation measures and BMPs are preventing herbicide drift to surface waters. This monitoring program should be described in the FEIS. (11).	By following labels for herbicide application we have to assume that the EPA levels for toxicity are met. Because the nature of weed seeds requires repeated treatment, sites are surveyed every year for effectiveness and non-target effects. BMPs were recently implemented and more time will determine their effect.

	Sensitive Species	
51	How is the Forest Service going to be precise enough in its' surveys to guarantee that sensitive and endangered plant species will not be affected? Is there a plan to re-seed areas with native seeds in an effort to facilitate recovery of native species (12)?	Sensitive plant surveys have been made and sites will be surveyed prior to weed control. Refer to Mitigation Measures, Sensitive Plants page 2-15, and Rare Native Plant Species in Chapters 3 and 4. Weed infestations have not degraded plant communities to the point that re-seeding is warranted. Most infestations have a low density of weeds, where re-vegetation is required, native species will be used if feasible. (See Appendix H).
52	The claim that "there will be no direct effects to wildlife species from alternative 1" is not supportable by facts. There is clear and unambiguous evidence to suggest that hiding cover and browse for many wildlife species will be directly altered as a result of aerial chemical application. There is evidence that suggest direct effects could include harm to individuals through toxic contamination as well. We do not believe that your claim of no direct effects is supported by your own data (12).	We reviewed the Risk Assessment for picloram, with your concern in mind. Page 4-28 of the FEIS addresses this concern by referencing the risk assessment for picloram on terrestrial species. The direct and indirect effects include discussion supported by the BA in Appendix M and is supported by concurrance from the US Fish & Wildlife Service in a letter dated April 17, 2002.
53	We assert that all areas determined to have sensitive, threatened or endangered plant species should be absolutely excluded from aerial or truck mounted application of chemicals. All chemical applications in these areas must be direct to the target weed if alternative 1 is indeed the forests' course of actions (12).	Refer to Mitigation Measures, Sensitive Plants page 2-15. No aerial or broadcast application of herbicides will take place over sensitive plant populations. Pre-treatment surveys occur before any new area is treated with herbicide and personnel are trained to identify all sensitive species and watch for them while treating weeds. Spot applications will be used near sensitive plant populations if deemed appropriate to control noxious weeds species. (See Chapter 3 and 4 - Rare Native Plant Species).
	Miscellaneous	
54	Page 1-6 states that weed control activities may occur in all management areas including Wilderness and Roadless areas. The ROD should specify what types of treatments will be allowed in these areas (1).	No mechanized treatment of weeds will take place inside wilderness boundaries. We will follow management guidelines to protect roadless values which allow mechanized use for weed treatment
55	Aerial application is a proven tool in effectively and economically managing noxious weeds growing in challenging terrain, and offers an application method with minimal disturbance to the landscape (2 & 4).	Thank you for commenting.

56	All treatment methods should be tracked to provide a comparison of the effectiveness of control measures (11).	All applicators are required to keep records and can be tracked. Districts continue selective monitoring for effectiveness of treatments
57	The term "unacceptable impact" is not clearly defined on pate 4-20 in relations to the impact of chemicals on wildlife. What sort of risk is acceptable, and what process has been developed to determine if a risk is "acceptable (12)?	A definition of unacceptable is included on page 4-20 of the FEIS. We rely on the EPA testing and registration process to determine acceptable risks. Further discussion is provided in the rest of the Wildlife Section beginning on page 4-20.
58	Page 4-25 claims that alternative 2 would "cause noxious weed populations to increase rapidly." This is not a fair or accurate statement. If it were true, then the application of mechanical, biological, and hand removal techniques of noxious weeds would actually cause weed populations to increase. We know that vectors such as roads, off road vehicles, and wind perpetuate weed infestations. We believe you made a mistake in the way you framed this determination (12).	That section was corrected to read "would allow" infestations to increase. Alternative 2 would leave too many infestations untreated, which would result in increased weed spread.
59	The name of Table 2.4.3 should be changed to "Partial List of Trade Names" because other trade names for specific chemicals are not listed. Some individuals my question the use of trade names not listed in the document (1).	Advice taken, thank you for commenting.
60	It is necessary to use an integrated approached to weed management and Alternative 1 follows that approach. Two of the most important factors in weed management are education and prevention. Alternative 1 supports both. (4)	Thank you for commenting. A detailed list of existing cooperative prevention and education projects is included in Appendix L.
61	The Forest should consider inviting the public to hand pull St. Johns-wort, and perhaps avoid and/or reduce the use of herbicides on this particular weed since it is highly valued as a medicinal herb (page 3-9). Can the locations of St. Johns-wort infestations be publicized so that those interested in harvesting the plant can harvest the plant without use of potentially toxic herbicides? It may be necessary to identify the characteristics of St. Johns-wort that quality it for eradication as a "weed" since some members of the public may not understand why a medicinal herb is being eradicated with potential toxic chemicals. (11)	St. Johnswort is a Category 1 Montana State Noxious weed. It is an aggressive weed species that shows little control through manual methods. Harvesting of this weed for medicinal use in northwest Montana has been attributed to its further expansion in the state. This plant is available through commercial means. It is best to maintain and harvest this species in area where it is not an aggressive invader of native plant communities.
62	What are the specific land management allocations of all lands proposed to be sprayed via airplane (12)?	This information was added in response to your comment. See Appendix J.

63	The EIS should disclose what acreages have been sprayed in the past, and why they have not been effective (3).	Acres sprayed are available in monitoring records maintained on each District. As described in the purpose and need in Chapter 1, there are areas that have not been sprayed because of difficult access. Where crews can get to infested sites, we have been able to suppress or contain weeds. Aerial spraying and use of newly registered chemicals was proposed to allow access to all sites and allow more effectively treatment of weeds in accessible and remote locations, see Chapter 2
64	The EIS should discuss why this latest proposal will be effective when earlier ones were not (3).	Please see Chapter 1, Purpose and Need.
65	We were somewhat disappointed that the Forest did not acknowledge to a greater extent the cooperative weed control efforts that are going on throughout Southwestern Montana. We feel these efforts have benefited the Forest as well as neighboring landowners and land managers (1).	Cooperative weed control efforts provide the critical prevention and education part of integrated weed management. We truly regret not describing those projects in the Draft EIS and include a list of projects and cooperators by District in Appendix L in the Final EIS.
66	What is the longer-term plan for Category 3 areas? What steps will be taken to prevent new weeds from being introduced (12)?	Category 3 is not an area but a classification for new species of weeds. Section 2.6 on page 2-8 features common to all addresses this concern. Alternative 1 on page 2-2 addresses treatment of new species.

Respondents

(1) East Pioneer Experimental Stewardship Program
(2) Smith 6-S Livestock
(3) Friends of the Bitterroot
(4) Powel County Weed Board
(5) Southwestern Montana Stockman's Association
(6) Beaverhead County Commissioners
(7) Beaverhead County Weed Control
(8) Ann Haggart
(9) Dean Stanchfield, Stanchfield Cattle Company
(10) Headwaters Range Weed Committee
(11) U.S. EPA
(12) Alliance for the Wild Rockies
(13) Tim Fay

Appendix F

Beaverhead-Deerlodge National Forest

Herbicide Spill Plan

Pesticide spill prevention and clean-up, as well as storage, transport, and disposal procedures are covered in detail in **Forest Service Handbook (FSH) 2109.12 Pesticide Storage, Transportation, Spills, and Disposal.** Any herbicide projects would follow the direction given in this handbook. It is available for review at U.S. Forest Service offices.

Required Equipment

The following equipment will be available with vehicles or pack animals used to transport pesticides and in the immediate vicinity of all spray operations.

1. A shovel
2. A broom (except backcountry operations)
3. 10 pounds of absorbent material or the equivalent in absorbent pillows
4. Large plastic garbage bags
5. Rubber gloves
6. Safety goggles
7. Protective overalls
8. Rubber boots

Material Safety Data Sheets will be reviewed with all personnel involved in the handling of pesticides.

EPA Guidance/CHEMTREC.

The following material from the U.S. EPA document entitled Applying Pesticides Correctly: A Guide for Private and Commercial Applicators will be reviewed with all personnel involved in handling pesticides.

CLEAN UP OF PESTICIDE SPILLS

Minor Spills

Keep people away from spilled chemicals. Rope off the area and flag it to warn people. Do not leave unless someone is there to confine the spill and warn of the danger. If the pesticide was spilled on anyone, wash it off immediately.

Confine the spill. If it starts to spread, dike it up with sand and soil. Use absorbent material such as cat litter, absorbent pillows, soil, sawdust, or absorbent clay to soak up the spill. Shovel all contaminated material into a leak proof container for disposal. Dispose of it as you would excess pesticides. Do not hose down the area, because this spreads the chemical. Always work carefully and do not hurry. Control access to the area until the spill is completely cleaned up.

Major Spills

The cleanup of a major spill may be too difficult for you to handle, or you may not be sure of what to do. In either case, keep people away, give first aid if needed, and confine the spill. Then call Chemtrec or the State pesticide authorities for assistance. Chemtrec

stands for Chemical Transportation Emergency Center, a public service of the Manufacturing Chemicals Association with offices located in Washington D.C. Chemtrec provides immediate advice for those at the scene of emergencies. Chemtrec operates 24 hours a day, seven days a week, to receive calls for emergency assistance. For help in chemical emergencies involving spills, leaks, fire, or explosions, call toll-free **800-424-9300** day or night. This number is for **emergencies** only.

If a major pesticide spill occurs on a highway, have someone call the highway patrol or the sheriff for help. (Carry these phone numbers with you.) Do not leave until responsible help arrives, in this case the local Montana Department of Agriculture Pesticide Specialist for the project area.

Northern Region Guidance In addition the section from the Northern Region Emergency and Disaster Plan entitled "Hazardous Materials Releases and Oil Spills" will be reviewed with all appropriate personnel (see following pages). Notification and reporting requirements as outlined in this section will be followed in the unlikely event of a serious spill.

HAZARDOUS MATERIALS RELEASES AND OIL SPILLS
(Excerpted from the Northern Region Emergency and Disaster Plan)

AUTHORITY: Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); and Superfund Amendments and Reauthorization Act of 1986 (SARA). Other statutes that may apply include Resource Conservation and Recovery Act (RCRA); Hazardous and Solid Waste Amendments (HSWA); Toxic Substances Control Act (TSCA); Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); Clean Water Act (CWA); and Clean Air Act (CAA).

DEFINITION: A hazardous materials emergency or oil spill is defined as any release or threat of release of a hazardous substance or petroleum product that presents an imminent and substantial risk of injury to health or the environment.

List of Citations

1987. *Northern rocky mountain wolf recovery plan.* U.S. Fish and Wildlife Service, Denver, CO. 119pp.

1992b. *Wolverine biology and management a literature review and annotated bibliography.* USDA-Forest Service, Northern Region, Missoula, MT. 106pp.

1993. *Grizzly bear recovery plan.* Missoula, MT. 181pp.

1995a. *Range permit reissuance-montane vole.* Prepared by M. Kastler, Region One. Missoula, MT.

1995b. Range permit reissuance-sage grouse. Prepared by M. Maj and J. Mariani, Region One. Missoula, MT.

Allen, A.W. 1987. "The relationship between habitat and furbearers." In Novak et al. *Wild furbearer management and conservation in North America.* Chapt. 18, pp164-179.

Armiger, Christine and Lindsey Sterling. 1998. "Utilization of nest trees and nest stands by northern goshawks in Southwestern MONTANA." Enviro. Field Stud. ENVS 429, WMC-UM, Dillon, MT. Unpublished Report.

Barnett, J.K and J.A. Crawford. 1994. "Pre-laying nutrition of sage grouse hens in Oregon." J. Range Management. 47:114-118.

Beaverhead National Forest. 1986. *Beaverhead Forest Plan.* USDA Forest Service. Dillon MT.

Beaverhead-Deerlodge National Forest. 1997. *Beaverhead Forest Plan Riparian Amendment.* USDA Forest Service. Dillon MT.

Bezanson, C.A. 1995. *Biodiversity and native plants: what's the connection?* University of Minnesota, St. Paul: Minnesota Plant Press 15(1).

Burbridge, W.R. and D.J. Neff. 1976. *Conconino National Forest-Arizona Game and Fish Department Cooperative Roads-wildlife study. In Proc. Elk-logging-roads Symp.*, ed. S.R. Hieb, pp44-57. Moscow: Univ. Idaho. 142pp.

Butts, Thomas W. 1992a. *Lynx biology and management a literature review and annotated bibliography.* USDA-Forest Service, Northern Region, Missoula, MT. 115pp.

Christy, Robin E.; Stephen D. West. 1993. "Biology of bats in Douglas-fir forests." Gen. Tech. Rep. PNW-GTR-308. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 28p

Christensen, Alan G.; Lyon L. Jack; Unsworth, James W. 1993. "Elk Management in the Northern Region: considerations in forest plan updates or revisions." Gen. Tech. Rep. INT-303. Ogden, Utah: USDA, Forest Service, Intermountain Research Station. 10pp.

Crowley, Caroline M. and John W. Connelly. 1996. *Sage grouse populations and habitat trends in Southeastern Idaho and Southwestern Montana.* Idaho Dept. of Fish and Game. Pocatello, Idaho. 205pp.

Daddow, R.L. and G.E. Warrington. 1983. *Growth limiting soil bulk densities as influenced by soil texture.* USDA, Forest Service, Watershed Systems Development Group, Fort Collins, Colorado.

Deerlodge National Forest. 1987. *Deerlodge Forest Plan.* USDA Forest Service, Butte MT.

DeGraaf, Richard M., Virgil E. Scott, R.H. Hamre, Liz Ernst and Stanley H. Anderson. 1991. *Forest and rangeland birds of the United States natural history and habitat use.* Agriculture Handbook 668, U.S. Department of Agriculture Forest Service. 625pp.

DeLuca, T. and P. Johnson. 1990. "RAVE: relative aquifer vulnerability evaluation." Montana Dept. of Agric., Environmental Management Division, MDA Tech. Bullletin 90-1, Helena, MT.

DiTomaso, Joseph M. 1999. "Risk Analysis of Various Weed Control Methods." Weed Science, as repeated in TechLine. University of California, Davis.

Dobkin, David S. 1994. *Conservation and management of neotropical migrant landbirds in the northern Rockies and great plains.* Moscow Idaho: University of Idaho Press, 220pp.

Donigian, A.S. and P.S. Rao. 1987. *Overview of terrestrial processes and modeling. IN: Vadose zone modeling of organic pollutants.* S.C. Hern and S.M. Melancon, eds. Boca Raton, Florida: Lewis Publishers.

Drut, M.S., W.H. Pyle and J.A. Crawford. 1994. "Technical Note: Diets and food selection of sage grouse chicks in Oregon." J. Range Management. 47:90-93.

Everett, R.L. 1994. "Restoration of stressed sites and processes. Volume IV, Eastside Forest Ecosystem Health Assessment." USDA, Forest Service, Pacific Northwest Research Station, General Technical Report PNW-GTR 330, Portland, OR.

Fager, C. 1991. "Harvest dynamics and winter use of the pine marten in Southwest Montana Job progress report W-100-R-4." Montana State University, Bozeman, MT. 73pp.

Fletcher, K. and B. Freedman. 1986. "Effects of the herbicides glyphosate, 2,4,5-trichlorophenoxyacetic acid, and 2,4-dichlorophenoxyacetic acid on forest litter decomposition." Can. J. For. Res. Vol. 16.

Foy, C.L. and D.W. Pritchard. 1996. *Pesticide formulation and adjuvant technology.* Boca Raton, Florida: CRC Press.

Gannon, Reese and Rowdy Brooks. 1998. "Vegetation and physical features at northern goshawk (Accipiter gentilis) nesting sites in Southwest Montana." Enviro. Field Stud. ENVS 429, WMC-UM, Dillon, MT. Unpublished Report.

Gomez, Daniel. 1999. *Mid-winter survey: Rocky Mountain population of trumpeter swans.* U.S. Fish and Wildlife Service, Red Rock Lakes National Wildlife Refuge. Lakeview, MT. 26pp.

Gorshkov, Mitya, G. Leighty, B. Mackey, J. Nardinger, A. Philips and S. Stark. 1998. "Habitat selection by American marten in Douglas-fir and lodgepole pine stands on the east side of the Pioneer mountains, Montana." Enviro. Field Stud. ENVS 491, WMC-UM. Dillon, MT. 15pp.

Greater Yellowstone Bald Eagle Working Group. 1996. *Greater Yellowstone bald eagle management plan: 1995 update.* Greater Yellowstone Bald Eagle Working Group, Wyoming Game & Fish Dept., Lander, WY 82520. 47pp.

Greitl, H. 1982. "Vegetation control with herbicides on the Beaverhead National Forest, southwest Montana." Unpublished report, Beaverhead National Forest, Dillon, MT.

Harvey, A.J., J.M. Geist, G.I. McDonald, M.F. Jurgensen, P.H. Cochran, D. Zabowski, and R.T. Meurisse. 1994. *Biotic and abiotic processes of eastside ecosystems: the effects of management on soil properties, processes, and productivity.* USDA, Forest Service, Pacific Northwest Research Station, General Technical Report PNW-GTR 323, Portland, OR.

Hayward, G.D. and J. Verner, tech. editors. 1994. *Flammulated, boreal, and great gray owls in the United States: A technical conservation assessment.* Gen. Tech. Rep. RM-253. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Experiment Station. 214pp.

Helena National Forest. 1999. *Nevada/Dalton Biological Assessment for Bull trout regarding chemical treatment of noxious weeds.* USDA Forest Service. Helena MT.

Hickenbottom, J.A.S. 2000. *A comparative analysis of surface erosion and water runoff from existing and recontoured Forest Service roads: O'Brien Creek Watershed, Lolo National Forest, Montana.* M.S. Thesis, University of Montana, Missoula. p.178.

Hill, S.B. and J. Ramsay. 1977. "Weeds as indicators of soil conditions." Ecological Agriculture Projects, EAP-67, McGill University, Ste Anne de Bellevue, QC, Canada.

Hillis, J. Michael, Michael J. Thompson, Jodie E. Canfield, L. Jack Lyon, C. Les Marcum, Patricia M. Dolan and David W. McCleerey. 1991. *Defining elk security: The Hillis Paradigm.* 38-43pp. IN A. G. Christensen, L. J. Lyon and T. N. Lonner, comps., Elk Vulnerability Symp., Montana State Univ., Bozeman. 330pp.

Hooper, D.U. 2000. "Interactions between aboveground and belowground biodiversity in terrestrial ecosystems: patterns, mechanisms, and feedback." BioScience, Dec. 2000.

Hutto, Richard L. 1995. *USFS Northern Region songbird monitoring program distribution and habitat relationships.* USFS contract #R1-95-05, Second Report. University of Montana, Missoula, MT. 120p.

Interagency Grizzly Bear Committee. 1987. *Grizzly bear compendium.* U.S. Fish and · Wildlife Service, Missoula MT. 540pp.

Kamrin, M.A. 1997. *Pesticide profiles: toxicity, environmental impact, and fate.* Boca Raton, Florida: CRC Press.

Keigley, R.B., and M.R. Frisina. 1998, *Browse Evaluation by Analysis of Growth Form, Volume I.*

Klebenow, D.D. 1972. The habitat requirements of sage grouse and the role of fire in management In Annual Proceedings Tall Timbers Fire Ecology Conference No. 12. Lubbock, TX. 305-315p.

Koehler, G.M. and J. David Brittell. 1990. Managing spruce-fir habitat for lynx and snowshoe hares. J. For. 88:10-14.

Lacey, J.R., C.B. Marlow, and J.R. Lane. 1989. "Influence of spotted knapweed *(Centaurea maculos*a) on surface runoff and sediment yield." Weed ech. 3:627-631.

Lacey, J.R., and C.B. Marlow. 1990. "Effects of spotted knapweed on soil erosion." Techline, DowElanco, Billings, MT.

Lane, J., C. Marlow, and J. Lacey. 1988. "Spotted knapweed costs managers soil and water." Agri Notes, Montana Agricultural Experiment Station, Montana State University, Bozeman.

Lolo National Forest, Missoula MT. 2001. *Lolo NF Big Game Winter Range and Burned Area Weed Management Draft EIS.*

Mariani, J.; B. Ruediger; J. Taylor; C. Paige; A. Christensen; P. Dolan; R. Krager; S. Ritter; M. Hillis and D. Davis. 1994. *Black-backed woodpecker, Northern Rockies.* USDA-Forest Service. Missoula, MT. 5pp.

Maser, C. 1997. *Sustainable forestry: philosophy, science, and economics.* Boca Raton, Florida: CRC, St. Lucie Press.

Maxell, B.A. 2000. *Management of Montana's Amphibians. A review of risk factors to population viability.* USDA Forest Service, Northern Rockies Region, Missoula, MT. 161 pp.

McAllister, Kelly R. 1995. *Washington State recovery plan for the pygmy rabbit.* Washington Dept. of Fish and Wildlife. Olympia, WA. 73pp.

Montana Bald Eagle Working Group. 1994. *Montana bald eagle management plan July 1994.* USDI, Bur. Rec., Billings, MT. 104pp.

Montana Bird Distribution Committee. 1996. *P.D. Skaar's Montana bird distribution,* Fifth Ed. Special Publication No. 3. Montana Natural Heritage Program, Helena. 130pp.

Muenchau, B.L. 1995. *Ferruginous hawk.* Pine Ridge Ranger District, Nebraska National Forest. Chadron, NE. 8pp.

Mussehl, Thomas W. and F.W. Howell. 1971. *Game management in Montana.* Montana Fish and Game Department, Game Management Division. W-3-C. Helena, MT. 238pp.

Norris, L.A. 1981. *The behavior of herbicides in the forest and risk assessment. IN: Proceedings of the John Wright Forestry Conference.* Reprinted by PNW Forest and Range Experiment Station, Portland, OR. p. 195-215.

Norris, L.A., H.W. Lorz and S.V. Gregory. 1983. *Influence of forest and rangeland management on anadromous fish habitat in western North America Forest chemicals.* USDA Forest Service General Technical Report PNW-149. PNW Forest and Range Experiment Station, Portland, OR. P.95.

Payne, G.F. 1972. "The effect of 2,4-D on sagebrush and associated vegetation on the Beaverhead National Forest, Montana." Montana Agricultural Experiment Station, Montana State University, Bozeman.

Peterson, Joel G. 1995. *Sagebrush ecological implications of sagebrush manipulation.* Montana Management Division, Montana Fish, Wildlife and Parks. W-101-R-2. Helena, MT. 49pp.

Poff, R.J. and D.J. Svoboda. 1981. *Land systems inventory for Beaverhead National Forest, southwestern* [From Range Veg]

Rauscher, Ryan L. 1997. *Status and distribution of the pygmy rabbit in Montana final report.* Montana Dept. of Fish, Wildlife and Parks. Bozeman, MT. 19pp.

Reichel, J. and D. Flath. 1995. "Identification of Montana's Amphibians and Reptiles." Montana Outdoors May/June. Montana Fish, Wildlife and Parks. Helena, MT 59601.

Reynolds, Richard T., Graham, Russell T., Reiser, M. Hildegard and others. 1992. *Management recommendations for the northern goshawk in the southwestern United States.* Gen. Tech. Rep. RM-217. Ft. Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 90p.

Rice, P.M. 2001. *INVADERS Database System* (http://invader.dbs.uMT.edu). Division of Biological Sciences, University of Montana, Missoula, MT 59812-4824

Rothacher, J. and W. Lopushinsky. 1974. *Soil stability and water yield and quality. IN: Environmental effects of forest residues management in the Pacific Northwest: A state-of–knowledge compendium.* USDA Forest Service Gen. Tech. Report PNW-24. PNW Forest and Range Experiment Station, Portland, OR. p. D1-19.

Ruggiero, Leonard, F., Keith B. Aurbury, Steven W. Buskirk, L. Jack Lyon and William J. Zieinski, tech. editors. 1994. *The scientific basis for conserving forest carnivores American marten, fisher, lynx and wolverine in the western United*

States. Gen. Tech. Rep. RM-254. Fort Collins, CO: U. S. Department of Agriculture, Rocky Mountain Forest and Range Experiment Station. 184pp

Servheen, C. and P. Sandstrom. 1993. *Ecosystem management and linkage zones for grizzly bears and other large carnivores in the northern Rocky Mountains in Montana and Idaho.* Endangered Species Technical Bulletin. Vol. XVIII No. 3. 10-13pp.

Sheley, R.L. & J.K. Petroff. Ed. 1999. *Biology and Management of Noxious Rangeland Weeds.* Corvallis, OR: Oregon State Univ. Press. 439pp

Singh, M. and S. Tan. 1996. *Herbicide leaching and its prevention. IN: Pesticide formulation and adjuvant technology.,* Foy, C.L. and D.W. Pritchard, eds. Boca Raton, Florida: CRC Press.

Stalling, D. 1999. *Weeds: An Exotic Invasion of Elk Country.* Rocky Mountain Elk Foundation, Missoula, MT.

Theil, R.P. 1985. *The relationship between road densities and wolf habitat suitability in Wisconsin.* Am. Midl. Nat. 113:404-407.

Thomas, J.W. 1979. *Wildlife habitats in managed forests the Blue Mountains of Oregon and Washington.* Agriculture Handbook No. 553. Pacific Northwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture. Portland, OR. 512pp.

Thomas, J.W. and D.E. Toweill. 1982. *Elk of North America: ecology and management.* Stackpole Books. Harrisburg, PA. pp698.

Tu, Mandy, Callie Hurd, and John M. Randall. 2001. *Weed Control Methods Handbook: Tools and Techniques for Use in Natural Areas,* Wildland Invasive Species Program, The Nature Conservancy.

U.S. Congress, Office of Technology Assessment, Harmful Non-Indigenous Species in the United States, *OTA-F-565* (Washington, DC: U.S. Government Printing Office, September 1993).

U.S.D.A. Forest Service. 994. "Tobacco Root Mountains Landscape Analysis." Madison Ranger District. Ennis, MT. Unpublished report.

FS RISK ASSESSMENTS

U.S.D.A. Forest Service. 1992. "Risk Assessment for Herbicide Use in Forest Service Regions 1, 2, 3, 4, and 10 and on Bonneville Power Administration Sites" Washington, D.C. FS 53-3187-9-30.

U.S.D.I. Fish and Wildlife Service. 1994. *50 CFR Part 17 Establishment of a nonessential experimental population of gray wolves in Yellowstone National Park in Wyoming, Idaho, Montana, Central Idaho and Southwestern Montana; Final Rules.* Federal Register. Vol.59, No.224. November 22, 1994. 60252-60281pp.

U.S. Fish and Wildlife Service. 1984. *American peregrine falcon recovery plan (Rocky Mountain/ Southwest population).* Prepared in cooperation with the American peregrine falcon recovery team. USFWS, Denver, CO. 105pp.

Vighi, M and A. DiGuardo. 1995. *Predictive approaches for the evaluation of pesticide exposure. IN: Pesticide risk in groundwater.* M. Vighi and E. Funari, eds. Boca Raton, Florida: CRC Press, Inc., Lewis Publishers.

Willard, E.E., D. Bedunah, and L.Marcum. 1988. *Impacts and potential impacts of spotted knapweed (Centaurea maculosa) on forest and range lands in western Montana.* Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana, Missoula.

Watson, V.J., P.M. Rice and E.C. Monnig. 1989. "Environmental fate of picloram used for roadside weed control." Journal of Environmental Quality 18:198-205.

Ward, A.L. 1976. *Elk behavior in relation to timber harvest operations and traffic on the Medicine Bow range in south-central Wyoming. In Proc. Elk-logging-roads Symp.,* ed. S.R. Hieb, pp32-43. Moscow: Univ. Idaho. 142pp.

Westbrook, R. 1998. Invasive Plants, Changing the Landscape of America: Fact book. Federal

Interagency Committee for the Management of Noxious and Exotic Weeds. Washington, D.C.

Youmans, Heidi B. 1992. *Statewide elk management plan for Montana.* Montana Dept. of Fish, Wildlife and Parks, Wildlife Division. Helena, MT. 171pp

Appendix H

Beaverhead-Deerlodge National Forest

Best Management Practices for Weed Control

USDA-Forest Service

Guide To

Noxious Weed Prevention Practices

Introduction

Preventing the introduction and spread of noxious weeds is one objective of Integrated Weed Management Programs on National Forest System lands throughout the United States. This Guide to Noxious Weed Prevention Practices (Guide) provides a comprehensive directory of weed prevention practices for use in Forest Service planning and wildland resource management activities and operations. This Guide will help National Forest and Grassland managers and cooperators identify weed prevention practices that mitigate identified risks of weed introduction and spread for a project or program.

This Guide uses the term "*weed*" to include all plants defined as "*noxious weeds*" by Forest Service policy:

> **". . .plants designated as noxious weeds by the Secretary of Agriculture or by the responsible State official. Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, and being native or new to or not common to the United States or parts thereof."** (FSM 2080.5)

For National Forests and Grasslands that use a State-defined noxious weed list, the listed weed species are the priority for implementing weed prevention practices in cooperation with neighbors and partners. National forests and grasslands that do not have a State-defined noxious weed list need to determine local weed prevention priorities using weed lists created by other State or local organizations. At line officer's discretion, the practices described in this Guide may also be applied to non-native invasive plants that are not defined as "noxious".

Supporting Direction

> This Guide to Noxious Weed Prevention Practices supports implementation of the February 3, 1999 Executive Order on Invasive Species. Federal agencies are expected to follow the direction in the Executive Order.

Development of weed prevention practices is supported by Forest Service noxious weed policy and strategy. Forest Service policy identifies prevention of the introduction and establishment of noxious weed infestations as an agency objective. This policy directs the Forest Service to: (1) determine the factors that favor establishment and spread of noxious weeds, (2) analyze weed risks in resource management projects, and (3) design management practices to reduce these risks. The Forest Service Noxious Weed Strategy identifies development of practices for prevention and mitigation during ground-disturbing activities as a long-term emphasis item. The February 1999 Executive Order on Invasive Species

requires Federal agencies to use relevant programs and authorities to prevent the introduction of invasive species and not authorize or carry out actions that are likely to cause the introduction or spread of invasive species unless the agency has determined, and made public, documentation that shows that the benefits of such actions clearly outweigh the potential harm, and all feasible and prudent measures to minimize risk of harm will need to be taken in conjunction with the actions.

Using This Guide

All resource management projects need to analyze weed risks in the planning stage. Risk includes identifying the likelihood of weeds spreading to the project area and determining the consequence of weed establishment in the project area. Resource programs undertaking maintenance operations need to analyze weed risks when preparing operating plans. A finding of risk is the basis for identifying the appropriate weed prevention practices from the Guide, which are likely to be effective in a particular project situation.

> The Guide to Noxious Weed Prevention Practices provides a toolbox of ideas for use in mitigating identified weed risks in resource management operations. The Guide adds no new requirements or regulations.
>
> **In 2001 two weed prevention practices are required by Forest Service policy:**
>
> 1. **For forested vegetation management operations, use equipment cleaning contract provisions WO-C/CT 6.36 (see Appendix 1)**
> 2. **Post and enforce weed-free feed orders, where they exist. (FSM 2081.03).**
>
> All other weed prevention practices in this Guide are optional for use based upon an analysis of weed risks. This list of practices, if applied, is considered to be good overall direction, however, not all of these practices can be implemented in every project.

When considering the use of a weed prevention practice for a specific project or resource program, evaluate the efficacy of the weed prevention practice to meet the goal, its feasibility to implement in the specific situation, and its cost-effectiveness. A determination of cost-effectiveness may consider the probability and cost of weed control if a weed prevention practice is not used and the relative contribution of the project or activity to the overall weed risk at the site.

The Guide identifies weed prevention practices that can be applied to specific site-disturbing projects and that may also be applicable for maintenance activities. These weed prevention practices are listed in the first section: "*General Weed Prevention Practices for Site-disturbing Projects and Maintenance Activities*." The remaining sections list weed prevention practices that are more uniquely applicable to particular resource management programs, listed by type of resource activity. The intent of this Guide is for managers to first identify and apply the General Weed Prevention practices and then supplement the same practices with the appropriate resource activity specific guidance.General Weed Prevention Practices for Site-disturbing Projects and Maintenance Programs

Goal 1: Incorporate weed prevention and control into project layout, design, alternative evaluation, and project decisions.

- Practice 1: Environmental analysis for projects and maintenance programs will need to assess weed risks, analyze potential treatment of high-risk sites for weed establishment and spread, and identify prevention practices. Determine prevention and maintenance needs, to include the use of herbicides, if needed, at the onset of project planning.

Goal 2. Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds.

- Practice 2. Before ground-disturbing activities begin, inventory and prioritize weed infestations for treatment in project operating areas and along access routes. Identify what weeds are on site, or within reasonably expected potential invasion vicinity, and do a risk assessment accordingly. Control weeds as necessary.
- Practice 3. After completing "Practice 2" above, to reduce risk of spreading weed infestations, begin project operations in uninfested areas before operating in weed-infested areas.
- Practice 4. Locate and use weed-free project staging areas. Avoid or minimize all types of travel through weed-infested areas, or restrict to those periods when spread of seed or propagules are least likely.
- Practice 5. Determine the need for, and when appropriate, identify sites where equipment can be cleaned. Clean equipment before entering National Forest System lands; a Forest Officer, in coordination with the Unit Invasive Species Coordinator, needs to approve use of on-Forest cleaning sites in advance. This practice does not apply to service vehicles traveling frequently in and out of the project area that will remain on the roadway. Seeds and plant parts need to be collected when practical and incinerated. Remove mud, dirt, and plant parts from project equipment before moving it into a project area.
- Practice 6. Clean all equipment, before leaving the project site, if operating in areas infested with weeds. Determine the need for, and when appropriate, identify sites where equipment can be cleaned. Seeds and plant parts need to be collected when practical and incinerated.
- Practice 7. Workers need to inspect, remove, and properly dispose of weed seed and plant parts found on their clothing and equipment. Proper disposal means bagging the seeds and plant parts and incinerating them.
- Practice 8. Coordinate project activities with any nearby herbicide application to maximize cost effectiveness of weed treatments.
- Practice 9. Evaluate options, including closure, to regulate the flow of traffic on sites where desired vegetation needs to be established. Sites could include road and trail rights-of-way, and other areas of disturbed soils.

Goal 3. Prevent the introduction and spread of weeds caused by moving infested sand, gravel, borrow, and fill material in Forest Service, contractor and cooperator operations. For practices 10 through 12 below, work with the responsible transportation agencies to voluntarily adopt these practices where county and state governments have responsibility for maintenance of roads that cross National Forest System lands.

- Practice 10. Inspect material sources on site, and ensure that they are weed-free before use and transport. Treat weed-infested sources for eradication, and strip and stockpile contaminated material before any use of pit material.
- Practice 11. Inspect and document the area where material from treated weed-infested sources is used, annually for at least three years after project completion, to ensure that any weeds transported to the site are promptly detected and controlled.
- Practice 12. Maintain stockpiled, uninfested material in a weed-free condition.

Goal 4. In those vegetation types with relatively closed canopies, retain shade to the extent possible to suppress weeds and prevent their establishment and growth.

- Practice 13. Retain native vegetation in and around project activity to the maximum extent possible consistent with project objectives.

Goal 5. Avoid creating soil conditions that promote weed germination and establishment.

- Practice 14. Minimize soil disturbance to the extent practical, consistent with project objectives.

Goal 6. Where project disturbance creates bare ground, consistent with project objectives, re-establish vegetation to prevent conditions to establish weeds.

- Practice 15. Revegetate disturbed soil (except travel ways on surfaced projects) in a manner that optimizes plant establishment for that specific site. Define for each project what constitutes disturbed soil and objectives for plant cover revegetation.
- Practice 16. Revegetation may include topsoil replacement, planting, seeding, fertilization, liming, and weed-free mulching as necessary. Use native material where appropriate and feasible. Use certified weed-free or weed-seed-free hay or straw where certified materials are required and/or are reasonably available. Always use certified materials in areas closed by administrative order; refer to Appendix 3 for a sample closure order. Where practical, stockpile weed-seed-free topsoil and replace it on disturbed areas (e.g. road embankments or landings)
- Practice 17. Use local seeding guidelines to determine detailed procedures and appropriate mixes. To avoid weed-contamination, a certified seed laboratory needs to test each lot against the all-State noxious weed list to Association of Seed Technologists and Analysts (AOSTA) standards, and provide documentation of the seed inspection test. There are plant species not on State and Federal noxious weed lists that the Forest Service would consider non-native invasive weeds. Check State and Federal lists to see if any local weeds need to be added prior to testing. Seed lots labeled as certified weed free at time of sale may still contain some weed seed contamination. Non-certified seed should first be tested before use.
- Practice 18. Inspect and document all limited term ground-disturbing operations in noxious weed infested areas for at least three growing seasons following completion of the project. For on-going projects, continue to monitor until reasonable certainty is obtained that no weeds have occurred. Provide for follow-up treatments based on inspection results.

Goal 7. Improve effectiveness of prevention practices through weed awareness and education.

- Practice 19. Provide information, training and appropriate weed identification materials to people potentially involved in weed introduction, establishment, and spread on National Forest System lands, including agency managers, employees, forest workers, permit holders, and recreational visitors. Educate them to an appropriate level in weed identification, biology, impacts, and effective prevention measures.
- Practice 20. Provide proficient weed management expertise at each administrative unit. Expertise means that necessary skills are available and corporate knowledge is maintained.
- Practice 21. Develop incentive programs encouraging weed awareness detection, reporting, and for locating new invaders.

Goal 8. Set the example; maintain weed-free administrative sites.

- Practice 22. Treat weeds at administrative sites and use weed prevention practices to maintain sites in a weed-free condition.

Aquatic Weed Prevention Practices

Goal 1. To prevent new weed infestations and the spread of existing weeds, avoid or remove sources of weed seed and propagules.

- Aquatic 1. Provide outreach to state fish and game departments, counties, and other agencies concerning the unique prevention measures and control practices associated with aquatic weeds.
- Aquatic 2. Inspect boats (including air boats), trailers, and other boating equipment and remove any visible plants, animals, or mud before leaving any waters or boat launching facilities. Drain water from motor, live well, bilge, and transom wells while on land before leaving the vicinity. Wash and dry boats, tackle, downriggers, anchors, nets, floors of boats, props, axles, trailers, and other boating equipment to kill weeds not visible at the boat launch.
- Aquatic 3. Before transporting to new waters, rinse boat and boating equipment with hot (40°C or 104°F) clean water, spray boat or trailer with high-pressure water, or dry boat and equipment for at least 5 days.
- Aquatic 4. Inspect seaplanes and remove weeds from floats, wires, cables, water rudders, and pump floats; wash with hot water or spray with high-pressure water, or dry for at least 5 days.
- Aquatic 5. Before take-off – avoid taxiing through heavy surface growths of weeds before takeoff; raise and lower water rudders several times to clear off plants. If weeds were picked up during landing, clean off the water rudders before take-off and leave the water rudders up during take-off. After take-off – if water rudders were down during take-off, raise and lower water rudders several times to free weed plant fragments while over original body of water or over land. If weeds remain visible on

floats or water rudders, the pilot may return to flight origin and remove plants if an extra landing and takeoff is not a safety concern.

- Aquatic 6. Maintain a 100 foot buffer of aquatic weed-free clearance around boat launches and docks.
- Aquatic 7. Promptly post sites if aquatic invasives are found. Confine infestation; where prevention is infeasible or ineffective, close facility until infestation is contained.
- Aquatic 8. Wash and dry tackle, downriggers, float tubes, waders, and other equipment to remove or kill harmful species not visible at the boat launch.
- Aquatic 9. Avoid moving weed plants from one body of water to another.
- Aquatic 10. Avoid running personal watercraft through aquatic plants near boat access locations. Instead, push or winch watercraft onto the trailer without running the engine. After the watercraft is out of the water, start the engine for 5-10 seconds to blow out any excess water and vegetation. After engine has stopped, pull weeds out of the steering nozzle. Inspect trailer and any other sporting equipment for weed fragments and remove them before leaving the access area. Wash or dry watercraft before transporting to another body of water.
- Aquatic 11. Waterfowl hunters may use elliptical, bulb-shaped, or strap anchors on decoys, because these types of anchors avoid collecting submersed and floating aquatic plants. Inspect waders and hip boots, removing any aquatic plants, and where possible, rinse mud from them before leaving the water. Remove aquatic plants, animals, and mud attached to decoy lines and anchors.
- Aquatic 12. Construct new boat launches and ramps at deep-water sites. Restrict motorized boats in lakes near areas that are infested with weeds. Move sediment to upland or quarantine areas when cleaning around culverts, canals, or irrigation sites. Clean equipment before moving to new sites. Inspect and clean equipment before moving from one project area to another.

Cultural Resources

- Use the General weed prevention practices.

Fire Management

Pre-fire, Pre-incident Training

Goal 1. Improve effectiveness of prevention practices through weed awareness and education.

- Fire 1. Increase weed awareness and weed prevention in all fire training.
- Fire 2. Include weed risk factors and weed prevention practices in Resource Advisor duties on all Incident Management Teams and Burn Rehabilitation Teams.

Plans

Goal 2. Improve effectiveness of prevention practices through weed awareness and education.

- Fire 3. Assign a local weed specialist or include in Resource Advisor duties to the Incident Management Team when wildfire or control operations occur in or near a noxious weed area.
- Fire 4. Resource Advisors need to provide briefings that identify operational practices to reduce weed spread, (for example: avoiding known weed infestation areas when locating fire lines). Include this information in shift briefings.
- Fire 5. Provide weed identification aids to Field Observers.

Goal 3. Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds.

- Fire 6. Ensure that rental equipment is free of weed seed and propagules before the contracting officers representative accepts it.
- Fire 7. Maintain a network of airports, helibases, camps, and staging areas in a noxious weed-free condition.
- Fire 8. Coordinate with local weed specialists to locate and treat practice jump areas to make them weed-free.
- Fire 9. Inspect and treat weeds that establish at equipment cleaning sites after fire incidents.

Goal 4. Avoid creating soil conditions that promote weed germination and establishment.

- Fire 10. Use appropriate suppression tactics to reduce suppression-induced disturbances to soil and vegetation while minimizing seedbed creation due to disturbance from fire effects. .
- Fire 11. Avoid moving water buckets from infested lakes to lakes that are not infested prior to inspection and cleaning. There is no hazard in using water infested with aquatic weeds on terrestrial sites.

Prescribed Fire

Goal 5. To prevent new weed infestations and the spread of existing weeds, avoid or remove sources of weed seed and propagules or manage fire as an aid in control of weeds.

- Fire 12. Ensure that rental equipment is free of weed seed and propagules before the contracting officers representative accepts it.
- Fire 13. Avoid ignition and burning in areas at high risk for weed establishment or spread due to fire effects. Treat weeds that establish or spread because of unplanned burning of weed infestations.
- Fire 14. When possible use staging areas and helibases that are maintained in a weed-free condition.
- Fire 15. Pre-inventory project area and evaluate weeds present with regard to the effects on the weed spread relative to the fire prescription.

Goal 6. Avoid creating soil conditions that promote weed germination and establishment.

- Fire 16. Use appropriate preparation and suppression tactics to reduce disturbances to soil and vegetation.

Fire Rehabilitation

Goal 7. Incorporate weed prevention into project layout, design, alternative evaluation, and decisions.

- Fire 17. Evaluate weed status and risks in Burned Area Emergency Rehabilitation plans. When appropriate, apply for Burned Area Emergency Rehabilitation and restoration funding.

Goal 8. To prevent conditions favoring weed establishment, re-establish vegetation on bare ground caused by project disturbance as soon as possible using either natural recovery or artificial techniques as appropriate to the site objectives.

- Fire 18. To prevent weed spread, treat weeds in burned areas as part of the Burned Area Emergency Rehabilitation plan. For known infestations that will likely increase, the first preference is prevention, such as planting species to compete with unwanted plants.
- Fire 19. Inspect and document weed establishment at fire access roads, cleaning sites, all disturbed staging areas, and within burned areas; control infestations to prevent spread within burned areas. If you suspect the presence of noxious weeds, request BAER funds to inspect and document for emergence in the spring. Request BAER funds for control if noxious weeds are present and NEPA has already been approved.
- Fire 20. Seed and straw mulch to be used for burn rehabilitation (for wattles, straw bales, dams, etc.) all need to be inspected and certified that they are free of weed seed and propagules.
- Fire 21. Regulate human, pack animal, and livestock entry into burned areas at risk for weed invasion until desirable site vegetation has recovered sufficiently to resist weed invasion.

Forest Vegetation Management

Timber Harvest Operations & Stewardship Contracting

Goal 1. Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds.

- Forest Veg 1. Treat weeds on projects used by contractors, emphasizing treatment of weed infestations on existing landings, skid trails, and helibases before activities commence.
- Forest Veg 2. Train contract administrators to identify noxious weeds and select lower risk sites for landings and skid trails.
- Forest Veg 3. Encourage operators to maintain weed-free mill yards, equipment parking, and staging areas.
- Forest Veg 4. Use standard timber sale contract provisions such as WO-C/CT 6.36 to ensure appropriate equipment cleaning (reference Appendix 1).

Goal 2. To prevent weed germination and establishment, retain native vegetation in and around project activity and keep soil disturbance to a minimum consistent with project objectives.

- Forest Veg 5. Minimize soil disturbance to no more than needed to meet project objectives. Logging practices to reduce soil disturbance include, but are not limited to:
  - Over-snow logging
  - Skyline or helicopter logging
  - Reuse landings, skid trails and helibases when they are weed free
- Forest Veg 6. Minimize period from end of logging to site preparation, revegetation, and contract closure.

Post Vegetation Management Operations

Goal 3. To prevent weed germination and establishment, retain native vegetation in and around project activity and keep soil disturbance to a minimum consistent with project objectives.

- Forest Veg 7. Minimize soil disturbance to no more than needed to meet vegetation management objectives. Prevention practices to reduce soil disturbance include, but are not limited to:
  - Treating fuels in place instead of piling
  - Minimizing heat transfer to soil in burning
  - Minimizing fire line construction

Goal 4. To prevent favorable conditions for weed establishment, re-establish vegetation on bare ground caused by project disturbance.

- Forest Veg 8. For long-term restoration and weed suppression where forested vegetation management has created openings, recognize the need for prompt reforestation.

Grazing Management

Goal 1. Consider noxious weed prevention and control practices in the management of grazing allotments.

- Grazing 1. Include weed prevention practices, inspection and reporting direction, and provisions for inspection of livestock concentration areas in allotment management plans and annual operating instructions for active grazing allotments.
- Grazing 2. For each grazing allotment containing existing weed infestations, include prevention practices focused on preventing weed spread and cooperative management of weeds in the annual operating instructions. Prevention practices may include, but are not limited to:
  - Altering season of use
  - Exclusion
  - Activities to minimize potential ground disturbance
  - Preventing weed seed transportation
  - Maintaining healthy vegetation

- Weed control methods
- Revegetation
- Inspection
- Reporting
- Education

Goal 2. Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds. Minimize transport of weed seed into and within allotments.

- Grazing 3. If livestock are potentially a contributing factor to seed spread, schedule use by livestock in units with existing weed infestations which are known to be susceptible to spread by livestock, to be prior to seed-set or after seed has fallen.
- Grazing 4. If livestock were transported from a weed-infested area, annually inspect and treat allotment entry units for new weed infestations.
- Grazing 5. Close pastures to livestock grazing when the pastures are infested to the degree that livestock grazing will continue to either exacerbate the condition on site or contribute to weed seed spread. Designate those pastures as unsuitable range until weed infestations are controlled.

Goal 3. Maintain healthy, desirable vegetation that is resistant to weed establishment.

- Grazing 6. Through the allotment management plan or annual operating instructions, manage the timing, intensity (utilization), duration, and frequency of livestock activities associated with harvest of forage and browse resources to maintain the vigor of desirable plant species and retain live plant cover and litter.
- Grazing 7. Manage livestock grazing on restoration areas to ensure that vegetation is well established. This may involve exclusion for a period of time consistent with site objectives and conditions. Consider practices to minimize wildlife grazing on the areas if needed.

Goal 4. Minimize disturbed ground conditions favorable for weed establishment in the management of livestock grazing.

- Grazing 8. Include weed prevention practices that reduce ground disturbance in allotment management plans and annual operating instructions. Consider for example: changes in the timing, intensity, duration, or frequency of livestock use; location and changes in salt grounds; restoration or protection of watering sites; and restoration of yarding/loafing areas, corrals, and other areas of concentrated livestock use.
- Grazing 9. Inspect known areas of concentrated livestock use for weed invasion. Inventory and manage new infestations.

Goal 5. Improve effectiveness of weed prevention practices through awareness programs and education. Promote weed awareness and prevention efforts among range permittees.

- Grazing 10. Use education programs or annual operating instructions to increase weed awareness and prevent weed spread associated with permittees' livestock management practices.
- Grazing 11. To aid in their participation in allotment weed control programs, encourage permittees to become certified pesticide use applicators.

Lands and Special Uses

Goal 1. Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds.

- Lands 1. Consider weed status of lands when making land adjustment decisions.
- Lands 2. Conduct weed inventories of all lands considered for acquisition.
- Lands 3. As a condition of land adjustment decisions, the Forest Service may require the nonfederal proponent to treat weeds, to federal standards, on the land proposed for federal acquisition.
- Lands 4. Include a weed prevention and control provision in all new special-use authorizations such as, permits, easements or leases involving ground-disturbing activities when authorized activities present a high risk for weed infestation or the location of the activity is vulnerable to weed introduction or spread. Include a weed prevention and control provision in existing authorizations that authorize ground-disturbing activities when the authorization is amended for other reasons; consider the need to amend an authorization directly, when ground-disturbing activities are involved. These provisions can be accomplished through the development and incorporation of a supplemental clause (reference sample clause R1-D4 in Appendix 2) or as a requirement in an associated operation and maintenance plan.

Minerals

Goal 1. Incorporate weed prevention into project layout, design, alternative evaluation, and decisions.

- Minerals 1. Include weed prevention measures, including project inspection and documentation, in operation and reclamation plans.

Goal 2. To prevent conditions favoring weed establishment, minimize bare soil conditions and re-establish vegetation on bare ground caused by project disturbance.

- Minerals 2. Retain bonds until reclamation requirements are completed, including weed treatments, based on inspection and documentation.

Recreation, Wilderness, and Special Management Areas

Goal 1. To prevent new weed infestations and the spread of existing weeds, avoid or remove sources of weed seed and propagules.

- Recreation 1. Encourage public land users before recreating on public lands, to inspect and clean motorized and mechanized trail vehicles of weeds and their seeds.
- Recreation 2. On designated public lands, issue closure orders that specify the use of weed free or weed-seed-free feed, hay, straw, and mulch. Refer to 36 CFR 251.50

and Appendix 3. Cooperate with State, County, Tribal governments, and other agencies to develop and support publicly available weed-free materials.

- Recreation 3. Where they exist, post and enforce weed-free feed orders. (FSM 2081.03)
- Recreation 4. Encourage backcountry pack and saddle stock users to feed stock only weed-free feed for several days before travel on National Forest System lands.
- Recreation 5. Inspect, brush, and clean animals, especially hooves and legs before entering public land. Inspect and clean tack and equipment.
- Recreation 6. Tie or hold stock in ways that minimize soil disturbance and avoid loss of desirable native vegetation.
- Recreation 7. Annually inspect all campgrounds, trailheads, and recreation areas that are open to public vehicle use for weeds; treat new infestations.
- Recreation 8. Maintain trailheads, boat launches, outfitter and public camps, picnic areas, airstrips, roads leading to trailheads, and other areas of concentrated public use in a weed-free condition. Consider high use recreation areas as high priority for weed eradication.
- Recreation 9. Consider seasonal or full time closure to campgrounds, picnic areas, and other recreation use areas until weeds are reduced to levels that minimize potentials for spread.
- Recreation 10. In areas susceptible to weed infestation, limit vehicles to designated, maintained travel routes. Inspect and document inspections on travelways for weeds and treat as necessary.

Goal 2. Improve effectiveness of prevention practices through weed awareness and education.

- Recreation 11. Post weed awareness messages and prevention practices at strategic locations such as trailheads, roads, boat launches, and forest portals.
- Recreation 12. In weed-infested areas, post weed awareness messages and prevention practices at roadsides.

Research Activities

Goal 1. Incorporate weed prevention into research project design, layout, installation, and decisions.

Research 1. Address weed establishment risk and spread in research project study plans and decisions.

Road Management

New and Reconstruction

Goal 1. Incorporate weed prevention into project layout, design, alternative evaluation, and decisions.

- Road 1. For timber sale purchaser road maintenance and decommissioning, use standard timber sale contract provisions such as WO-C/CT 6.36 to ensure appropriate equipment cleaning (reference Appendix 1).
- Road 2. For roads, new and reconstructed, conducted as part of public works (construction) contracts and service contracts include contract language for equipment cleaning such as is in WO-C/CT 6.36 (Appendix 1).

Goal 2. Minimize roadside sources of weed seed that could be transported to other areas.

- Road 3. Periodically inspect system roads and rights-of-way for invasion of noxious weeds. Train road maintenance staff to recognize weeds and report locations to the local weed specialist. Inventory weed infestations and schedule them for treatment.
- Road 4. Schedule and coordinate blading or pulling of noxious weed-infested roadsides or ditches in consultation with the local weed specialist. Do not blade or pull roadsides and ditches that are infested with noxious weeds unless doing so is required for public safety or protection of the roadway. If the ditch must be pulled, ensure the weeds remain on-site. Blade from least infested to most infested areas. When it is necessary to blade noxious weed-infested roadsides or ditches, schedule activity when seeds or propagules are least likely to be viable and to be spread. Minimize soil surface disturbance and contain bladed material on the infested site.
- Road 5. Avoid acquiring water for dust abatement where access to the water is through weed-infested sites.
- Road 6. For timber sale purchaser road maintenance and decommissioning, use contract provisions for equipment cleaning such as WO-C/CT 6.36 (Appendix 1).
- Road 7. For road maintenance and decommissioning conducted as part of public works (construction) contracts and service contracts include contract language for equipment cleaning such as is in WO-C/CT 6.36 (Appendix 1).
- Road 8. Treat weeds in road decommissioning and reclamation projects before roads are made impassable. Reinspect and follow-up based on initial inspection and documentation.

Goal 1. Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds.

- Watershed 1. Inspect and document for early detection of noxious weed establishment and spread in riparian areas and wetlands. Eradicate new infestations before they become established.

- Watershed 2. Address noxious weed risks in watershed restoration projects and water quality management plans.
- Watershed 3. Pay particular attention to practices listed under "General Weed Prevention Practices for Site-disturbing Projects and Maintenance Programs" and Aquatic Weed Prevention Practices".

Goal 1. Avoid creating soil conditions that promote weed germination and establishment.

- Wildlife 1. Periodically inspect and document those areas where wildlife concentrate in the winter and spring resulting in overuse or soil scarification.
- Wildlife 2. Use weed-free materials at big game baiting stations.
- Wildlife 3. For wildlife openings and habitat improvement projects, follow the practices outlined in General Weed Prevention Practices--Goal 4; Forest Vegetation Management, Timber Harvest Operations & Stewardship Contracting.

Forest Service Timber Sale

Contract Provisions

WO-C6.36

C6.36 – EQUIPMENT CLEANING. (5/01) Unless the entire Sale Area is already infested with specific noxious weed species of concern, Purchaser shall ensure that prior to moving on to the Sale Area all off-road equipment, which last operated in areas known by Forest Service to be infested with specific noxious weeds of concern, is free of soil, seeds, vegetative matter, or other debris that could contain or hold seeds. Purchaser shall certify in writing that off-road equipment is free of noxious weeds prior to each start-up of timber sale operations and for subsequent moves of equipment to Sale Area. The certification shall indicate the measures taken to ensure that off-road equipment is free of noxious weeds will be identified. "Off-road equipment" includes all logging and construction machinery, except for log trucks, chip vans, service vehicles, water trucks, pickup trucks, cars, and similar vehicles. A current list of noxious weeds of concern to Forest Service is available at the Forest Supervisor's Office.

Purchaser must clean off-road equipment prior to moving between cutting units on this timber sale that are known to be infested with noxious weeds and other units, if any, that are free of such weeds. Sale Area Map shows areas, known by Forest Service prior to timber sale advertisement, that are infested with specific noxious weed species of concern.

Purchaser shall employ whatever cleaning methods are necessary to ensure that off-road equipment is free of noxious weeds. Equipment shall be considered free of soil, seeds, and other such debris when a visual inspection does not disclose such material. Disassembly of equipment components or specialized inspection tools is not required.

Purchaser shall notify Forest Service at least 5 days prior to moving each piece of off-road equipment on to the Sale Area, unless otherwise agreed. Notification will include

identifying the location of the equipment's most recent operations. If the prior location of the off-road equipment cannot be identified, Forest Service may assume that it was infested with noxious weed seeds. Upon request of Forest Service, Purchaser must arrange for Forest Service to inspect each piece of off-road equipment prior to it being placed in service.

If Purchaser desires to clean off-road equipment on National Forest land, such as at the end of a project or prior to moving to a new unit that is free of noxious weeds, Purchaser and Forest Service shall agree on methods of cleaning, locations for the cleaning, and control of off-site impacts, if any.

New infestations of noxious weeds, of concern to Forest Service and identified by either Purchaser or Forest Service on the Sale Area, shall be promptly reported to the other party. Purchaser and Forest Service shall agree on treatment methods to reduce or stop the spread of noxious weeds when new infestations are found. In the event of contract modification under this Subsection, Purchaser shall be reimbursed for any additional protection required, provided that any work or extra protection required shall be subject to prior approval by Forest Service. Amount of reimbursement shall be determined by Forest Service and shall be in the form of a reduction in stumpage rates, unless agreed otherwise in writing. However, in no event may stumpage rates be reduced below Base Rates.

INSTRUCTIONS: Include in all new contracts.

The Forest Service must identify on the sale area map units that are infested with specific noxious weeds species of concern.

The prospectus for the sale must notify prospective purchasers that maps of these known locations are available from the local Forest Supervisor's Office or District Ranger Station. A list of noxious weeds of concern to the Forest Service (normally included in the Noxious Weed Program Guide) must be available for the purchaser's inspection. The current National Forest Noxious Weed Program Guide, noxious weed atlas, or other data sources, as needed, will be used to determine locations of known infestation.

Significant changes in the status of noxious weed infestations on the sale may require contract modifications to deal with changed conditions. An example might be where new noxious weed infestations are discovered after contract award, which require costly additional methods to prevent the spread of such infestations.

WO-CT6.36

CT6.36 – EQUIPMENT CLEANING. (5/01) Unless the entire Sale Area is already infested with specific noxious weed species of concern, Purchaser shall ensure that prior to moving on to the Sale Area all off-road equipment, which last operated in areas known by Forest Service to be infested with specific noxious weeds of concern, is free of soil, seeds, vegetative matter, or other debris that could contain or hold seeds. Purchaser shall certify in writing that off-road equipment is free of noxious weeds prior to each start-up of timber sale operations and for subsequent moves of equipment to Sale Area. The certification shall indicate the measures taken to ensure that off-road equipment is free of noxious weeds will be identified. "Off-road equipment" includes all logging and construction machinery, except for log trucks, chip vans, service vehicles, water trucks,

pickup trucks, cars, and similar vehicles. A current list of noxious weeds of concern to Forest Service is available at the Forest Supervisor's Office.

Purchaser must clean off-road equipment prior to moving between cutting units on this timber sale that are known to be infested with noxious weeds and other units, if any, that are free of such weeds. Sale Area Map shows areas, known by Forest Service prior to timber sale advertisement, that are infested with specific noxious weed species of concern.

Purchaser shall employ whatever cleaning methods are necessary to ensure that off-road equipment is free of noxious weeds. Equipment shall be considered free of soil, seeds, and other such debris when a visual inspection does not disclose such material. Disassembly of equipment components or specialized inspection tools is not required.

Purchaser shall notify Forest Service at least 5 days prior to moving each piece of off-road equipment on to the Sale Area, unless otherwise agreed. Notification will include identifying the location of the equipment's most recent operations. If the prior location of the off-road equipment cannot be identified, Forest Service may assume that it was infested with noxious weed seeds. Upon request of Forest Service, Purchaser must arrange for Forest Service to inspect each piece of off-road equipment prior to it being placed in service.

If Purchaser desires to clean off-road equipment on National Forest land, such as at the end of a project or prior to moving to a new unit that is free of noxious weeds, Purchaser and Forest Service shall agree on methods of cleaning, locations for the cleaning, and control of off-site impacts, if any.

New infestations of noxious weeds, of concern to Forest Service and identified by either Purchaser or Forest Service on the Sale Area, shall be promptly reported to the other party. Purchaser and Forest Service shall agree on treatment methods to reduce or stop the spread of noxious weeds when new infestations are found. In the event of contract modification under this Subsection, Purchaser shall be reimbursed for any additional protection required, provided that any work or extra protection required shall be subject to prior approval by Forest Service. Amount of reimbursement shall be determined by Forest Service and shall be in the form of a reduction in stumpage rates, unless agreed otherwise in writing. However, in no event may stumpage rates be reduced below Base Rates.

INSTRUCTIONS: Include in all new contracts.

The Forest Service must identify on the sale area map units that are infested with specific noxious weeds species of concern.

The prospectus for the sale must notify prospective purchasers that maps of these known locations are available from the local Forest Supervisor's Office or District Ranger Station. A list of noxious weeds of concern to the Forest Service (normally included in the Noxious Weed Program Guide) must be available for the purchaser's inspection. The current National Forest Noxious Weed Program Guide, noxious weed atlas, or other data sources, as needed, will be used to determine locations of known infestation.

Significant changes in the status of noxious weed infestations on the sale may require contract modifications to deal with changed conditions. An example might be where new noxious weed infestations are discovered after contract award, which require costly additional methods to prevent the spread of such infestations

Sample Special Use Supplemental Clause

USDA-Forest Service

Northern Region

Include a weed prevention and control provision, such as the following supplemental clause example, in all new special-use authorizations such as, permits, easements, and leases, or when those authorizations are amended, when there are ground-disturbing activities.

The following is a weed prevention and control supplemental clause approved for use in Region 1. **(Reminder: Supplemental clauses used in a special use authorization must be reviewed and approved by the Regional Forester, after review by the local Office of the General Counsel.)**

R1 SUPPLEMENT 2709.11-2000-1 **2709.11, 50**

EFFECTIVE 02/08/2000 **Page 31 of 41**

R1-D4 - Noxious Weed/Exotic Plant Prevention and Control. Use this clause in all authorizations involving ground disturbance which could result in the introduction or spread of noxious weeds and/or exotic plants. This clause may also be used where cooperative Agreements for noxious weed control are in place with state and local governments.

The holder shall be responsible for the prevention and control of noxious weeds and/or exotic plants of concern on the area authorized by this authorization and shall provide prevention and control measures prescribed by the Forest Service. Noxious weeds and exotic plants of concern are defined as those species recognized by (*insert county weed authority and/or national forest*) in which the authorized use is located.

The holder shall also be responsible for prevention and control of noxious weed and exotic plant infestations which are not within the authorized area, but which are determined by the Forest Service to have originated within the authorized area.

When determined to be necessary by the authorized officer, the holder shall develop a site-specific plan for noxious weed and exotic plant prevention and control. Such plan shall be subject to Forest Service approval. Upon Forest Service approval, the noxious weed and exotic plant prevention and control plan shall

> become a part of this authorization, and its provisions shall be enforceable under the terms of this authorization.

With respect to the second paragraph of the above provision, the intent is to apply this provision only for a well defined confined area such as a narrow linear right-of-way where it can be determined without a doubt that the noxious weeds resulted from the activities of the holder.

Example of a Closure Order

Closure Order

SPECIAL ORDER

OCCUPANCY AND USE

ON NATIONAL FOREST SYSTEM LANDS

IN THE STATE OF MONTANA

Pursuant to the Regulations of the Secretary of Agriculture, Title 36 CFS 261.50 (a) and (b), the following acts are prohibited within all National Forest System lands within the State of Montana.

These restrictions are in addition to those enumerated in Subpart A, part 261, Title 36 of the Code of Federal Regulations and will remain in effect from October 6, 1997, until rescinded or revoked.

1. The possession or storage of hay, grain, straw, cubes, palletized feed or mulch that is not certified as being noxious weed free or noxious weed seed free by an authorized State Department of Agriculture official or designated county official; each individual bale or container must be tagged or marked as weed free and reference the written certification (36 CFR 261.58 (t)).

Pursuant to 36 CFR 261.50 (e), the following are exempt from this Order:

A. Persons with a permit specifically authorizing the action or omission.

B. Transporting feeds, straw, or hay on Federal, State, and county roads that are not Forest Development Roads or Trails.

The above restrictions are necessary to prevent the spread of noxious weeds on National Forest Systems lands (16 USC 551). Upon issuance of this order, all previous orders requiring the use of certified noxious weed free or noxious weed seed free forage on NFS lands in Montana shall be superceded.

Violation is punishable by a fine of up to $5,000 and/or up to six months imprisonment (16 U.S.C. 551 and 18 U.S.C. 3571 (b) (6).

/S/ Kathleen A. McAllister 10-8-97

HAL SALWASSER Date

Regional Forester

Northern Region

Appendix I

Beaverhead-Deerlodge National Forest

BIOLOGICAL CONTROL AGENTS

SPOTTED KNAPWEED

Species	Type of Insect	Damage to Host
Agapeta zoegana	Root boring moth	Larvae root boring
Cyphocleonus achates	Root boring weevil	Larvae root boring Adults defoliate small plants
Metzneria paucipunctella	Seedhead moth	Larvae damage flowers and consume seeds
Urophora affinis	Seedhead gall fly	Larvae induces gall formation
Urphora quadrifasciata	Seedhead gall fly	Larvae induces gall formation
Larinus minutus	Seedhead weevil	Larvae damages flowers and consumes seeds
Bangasternus fausti	Seedhead weevil	Larvae consumes seeds
Chaetorellia acrolophi	Seedhead fly	Larvae consumes seeds

LEAFY SPURGE

Species	Type of Insect/Animal	Damage to Host
Sheep & Goats	Herbivore	Consume flowers, leaves, and seed heads
Aphthona species	Flea beetle	Larvae feed on roots
Oberea erythrocephala	Long horned beetle	Larvae feed on roots & stems
Spurgia esulae	Gall midge	Shoot tip feeders, larvae induces gall formation

CANADA THISTLE

Species	Type of Insect	Damage to Host
Urophora cardui	Shoot gall fly	For galls on stem – affects normal metabolic processes of plant
Larinus planus	Seed head weevil	Larvae feed on flower head Adults feed on foliage
Ceutorhynchus litura	Stem mining weevil	Larvae mine plant stem
Cassida rubiginosa	Defoliating beetle	Feeds on plant foliage

MUSK THISTLE

Species	Type of Insect	Damage to Host
Rhinocyillus conicus	Seed head weevil	Larvae feed on developing seeds
Trichosirocalus horridus	Weevil	Feeds on rosettes Disrupts apical dominance
Cassida rubiginosa	Beetle	Feeds on foliage

YELLOW AND DAMATION TOADFLAX

Species	Type of Insect	Damage to Host
Brachypterolus pulicarious	Beetle	Feed on the flower Destroy reproductive organs

TANSY RAGWORT

Species	Type of Insect	Damage to Host
Longitarsus jacobaeae	Flea beetle	Feeds on the roots

POISON HEMLOCK

Species	Type of Insect	Damage to Host
Agonopterix alstroemeriana	Moth	Defoliates the plant

History of Biological Control

Beaverhead-Deerlodge National Forest

Biological control of noxious weeds has been an on-going supplement to chemical weed control on the Beaverhead-Deerlodge National Forest since the late 1970's.

Forest records indicate that biological control of noxious weeds on the Beaverhead-Deerlodge National Forest started in about 1979. Early releases consisted of the Thistle head weevil *(Rhinocyllus conicus)* on musk thistle; Knapweed seed head fly *(Urophora affinis* and *U. quadriffasciata)* on knapweed, and Leafy spurge hawkmoth *(Hyles euphorbiae)* on leafy spurge. These three biological agents have successfully survived throughout the Forest. The Thistle head weevil and Knapweed seed head fly can be found in most infestations of musk thistle and spotted knapweed, respectively, across the Forest. To a lesser extent, the Leafy spurge hawkmoth is common in large leafy spurge infestations on the northern portion of the Forest. Although these agents have successfully survived and reproduced, their affects on target weeds has been minimal at best.

In the late 1980's and early 1990's, additional biological control agents were approved for use on spotted knapweed and leafy spurge. During this time period, biological control was somewhat limited by cost, with insects costing from $0.50 to $4.50 each. Release sizes during this period typically ranged from 100 to 400 insects, depending on species and cost. Species released at this time included the Leafy spurge flea beetles *(Apthona spp.)* and Red-headed leafy spurge stem borer *(Oberea erythrocephala)* on leafy spurge; Yellow-winged knapweed moth *(Agepeta zoegana)* and Knapweed root weevil *(Cyphocleonus achates)* on spotted knapweed; Canada thistle stem weevil *(Ceutorhynchus litura)* on Canada thistle, and Toadflax moth *(Caliphasia lunula)* on dalmation toadflax. Survival rate of these agents, with the exception of the *Apthona spp.*, was very low. Appearance of low survival rates at release sites may have been influenced by one or more of the following; low initial release numbers, environmental conditions or predators at the site, ability of the biological agent to relocate, or monitoring techniques used. The flea beetles *(Apthona spp.)* seemed to be more prolific than others. By the mid 1990's, there were several sites on the Forest that were actually showing a decrease in leafy spurge density. These affect sites ranged from a couple of square feet to approximately ½ acre in size.

From mid 1990's to present, the flea beetles *(Apthona spp)* have been readily available for little or no cost. Subsequently, release sizes increased from a few hundred insects to several thousand per release. Although survival has been documented on many of these sites, they have not been in place long enough to accurately determine effects on the leafy spurge infestations. Other biological control agents currently being released include; Leafy spurge tip gall midge *(Spurgia esulae)* on leafy spurge; Lesser knapweed flower weevil *(Larinus minutus)* on knapweed; Root-boring moth *(Eteobalea serratella)*, Toadflax flower-feeding beetle *(Brachypterolus pulicarius)*, Toadflax capsule weevil *(Gymnetron antirrhini)* and Stem-boring weevil *(Mecinus janthinus)* on dalmation toadflax. These releases, like the more recent flea beetle releases, have not been in place long enough to accurately evaluate their survival or effectiveness.

The Beaverhead-Deerlodge National Forest has 254 documented biological control agent releases, with release numbers varying from 9 individuals to 2500. Locations of these release sites seem to fit on of the following scenarios: 1) location where use of herbicides is unacceptable or prohibited; 2) location is inaccessible to herbicide application equipment; or 3) infestation size is large enough that perimeters can be chemically treated without affecting the biological agent population.

Biological control appears to be a long-term supplement to the Forest's weed control program. Currently, biological control agents, although showing some effect, are not keeping up with the spread of noxious weeds on the Forest. Chemical control methods are necessary to keep noxious weeds at a manageable level, while biological agent populations increase to an effective level.

Beaverhead-Deerlodge National Forest

Aerial Spray Report

Descriptions and locations are shown on the Forest Plan Management Area Maps for the Beaverhead National Forest Plan 1981 and the Deerlodge National Forest Plan 1987

Management Area	Size in acres
Beaverhead	
MGT_AREA – 1	577.03
MGT_AREA – 14	19.12
MGT_AREA – 16	84.92
MGT_AREA – 17	154.19
MGT_AREA – 20	433.78
MGT_AREA – 21	40.51
MGT_AREA – 24	861.20
MGT_AREA – 25	655.25
MGT_AREA – 26	462.57
Deerlodge	
MGT_AREA - A1	223.98
MGT_AREA - A2	225.71
MGT_AREA – A5	6151.20
MGT_AREA - A6	9497.82
MGT_AREA - A7	241.91
MGT_AREA - C1	6259.11
MGT_AREA - C2	1622.93
MGT_AREA - C3	755.22
MGT_AREA - C4	219.07
MGT_AREA - C5	436.95
MGT_AREA - C7	712.31
MGT_AREA - D1	401.31
MGT_AREA - D2	10729.06
MGT_AREA - E1	12128.24
MGT_AREA - E3	2120.14
MGT_AREA - F1	1952.83
MGT_AREA - J2	110.81
MGT_AREA - MA5	28.92
MGT_AREA - MC1	296.70
MGT_AREA – PVT	2.41
Total	57,405.20

Beaverhead-Deerlodge National Forest

Sensitive Plants, *Phlox kelseyi var. missouleasis* on the West Fork Buttes Allotment. Knapweed plants were spot-sprayed with Clopyralid (Stinger) in April of 1992. This photo was taken a year later.

Beaverhead-Deerlodge National Forest

Ranger District	Weed Coordination Efforts
PINTLER	Coordinate with Montana Fish, Wildlife, & Parks weed spraying on big game winter range through SIKES act.
	Coordinate weed management activities with Philipsburg City Council within the Fred Burr Watershed.
	Periodic column submitted on noxious weeds in Philipsburg newspaper.
	Obtained a $30,000 grant for weed education and prevention in Powell, Deer Lodge, and Granite counties.
	Contracted with an individual for weed education using funds from Grant listed above.
	Cooperate with and support the development of Weed Management areas within the county jurisdiction.
	Participate in Conservation District's "Resource Day" providing noxious weed and biological control presentations.
	Work with Powell County to make and distribute "Wanted: Weed Free National Forest" signs.
	Provide financial support for publication of an annual weed education insert in the *Missoulian* Newspaper with the Lolo National Forest.
	Coordinate with Granite County Weed Board to provide educational material.
	Coordinate projects with private weed districts adjacent to the Pinler District.
	Contract weed spraying with Granite County
	District Weed Coordinator is a member of the Granite County Weed Board
BUTTE	$6,000 education grant for weed education program by grade students (administered by??) Silverbow County
	Weed spray day with Fish, Wildlife, & Parks in Fleecer area
	Coordinates with Natural Resource Conservation Service
JEFFERSON	Coordinates with Jefferson County Weed Coordinator to spray/manage common road weed control responsibilities.
	Cooperates with Jefferson, Madison, and Maher Counties, Helena National Forest, Bureau of Land Management, State of Montana, and several private ranches, tract landowners, etc., to develop noxious weed control grant project applications.
	Cooperates with groups listed above in administration and implementation of successful weed grants including those granted by the Montana Noxious Weed Trust Fund, Montana Off Highway Vehicle Program Fund, Sykes Act, Rocky Mountain Elk Foundation, and the Mule Deer Foundation

Ranger District	Weed Coordination Efforts
	Works cooperatively with and supports the Whitehall High School Biologic agent rearing program to raise and disseminate bio-agents from the greenhouse at Whitehall High School
DILLON	D1/D2/D3 road treatment agreement.
	Coordinate with Beaverhead County
	County weed control days (up to 100 people)
	Big Hole Weed Pull days
	Coordinate with Dubois District of Targhee National Forest in Idaho
MADISON	Cooperator in the Madison Valley Ranchland Group, Weed Committee, Madison Valley Weed Mapping project. Grants and in kind services hired crews to inventory and map weed infestations in the Madison Valley, primarily on private lands. Weeds were mapped with GPS and input into an electronic GIS layer. Project mapped over 42,000 acres of weed infestations. Funding currently sought to initiate weed control and continue mapping effort.
	Participant in Upper Madison Weed Management Area with County, NPS, BLM, State Lands, Fish and Game, and many private landowners.
	Coordinate with Madison County for swapping road treatment.
	Various annual weed education workshops.
	Coordinate weed spray days; Ruby Dam, McAtee Bridge, Upper Valley.
	Rocky Mountain Elk Foundation Grant to spray knapweed on winter range area in the Gravelly Mountains.
	Cooperator in project to map weed infestations through remote sensing applications. Use of high elevation aerial hyperspectral imaging equipment to detect knapweed and leafy spurge.
	Cooperator in field scabious control research with Madison County, BLM, Turner Ranches, Sun Ranch and Dow Agroscience.

Ranger District	Weed Coordination Efforts
WISE RIVER	Montana Weed Trust Fund grants to Beaverhead, Deerlodge, and Butte-Silver Bow Counties along Big Hole River. Various grants from this trust fund have been obtained for over 10 years.
	National Fish and Wildlife Foundation grant for education and mapping of weeds along the Big Hole River corridor. Beaverhead, Deerlodge, and Butte-Silver Bow Counties have been cooperators in this effort.
	Cost share grants, $5,000 with private landowners for chemical and some equipment.
	Rocky Mountain Elk Foundation Grants to spray hounds tongue on Big Game Winter Range. Beaverhead, Deerlodge, and Butte-Silver Bow Counties have been cooperators in this effort.
	Participate in two spray days and one weed pull day in Wise River, one spray day in Dewey, and one spray day in Divide with Beaverhead, Deerlodge, and Butte-Silver Bow Counties.
	Headwaters RC&D funded to to put weed prevention ads in local papers. This organization also sponsors vehicle washes in cooperation with local car washes in Butte prior to the start of general fishing and hunting seasons.
	Coordinated with BLM on burn and spray project for knapweed
	Montana Dept Fish Wildlife and Parks funded an ATV and ATV spray equipment for use of local snowmobile club to cooperate in treatment of weeds on back country trails.
	Forest Service stores slip-in sprayer provided by Beaverhead County for use by local land owners to treat weeds. Beaverhead County shares the cost of herbicides with local landowners.
WISDOM	Received Sikes Act funding in the past for knapweed spraying and monitoring on elk calving / big game summer-fall range in the north Big Hole.
	Participate and coordinate with Beaverhead County Weed Supervisor and local landowners / residents of the Big Hole Valley in spray days along Highways 43, 278 and county roads in July and August of each year.
	Wisdom Ranger Station houses Beaverhead County slip-on tank and sprayer for use by local landowners

Ranger District	Weed Coordination Efforts
	Implement annual cooperative agreement with State and County that allows FS crews to spray Highway 43 and some county roads leading to the National Forest in trade for county weed control work on portions of National Forest roads
	Assist the National Park Service in sparying, pulling and monitoring noxious weeds on the Big Hole National Battlefield in exchange for Park Service assistance in spraying and pulling on portions of the National Forest.
	Conduct weed plant identification and prevention education at the Wisdom and Jackson Public Schools on a recurring schedule.
	Solicit and receive annual funding from the Salmon National Forest to spray, map and monitor noxious weeds along the Continental Divide between Morgan Mountain and the Gibbonsville Road along the Montana-Idaho border to reduce the risk of infestation expansion into the Big Hole Valley.
	Organized, wrote and recorded, with the B-D Public Information Officer, newspaper and radio education spots to promote noxious weed prevention awareness in Beaverhead, Deerlodge, Butte-Silver Bow, Ravalli, Missoula and Flathead Counties.
	Organized, supervised and provided crews for truck and ATV weed washes in the town of Wisdom during hunting season over several years using FS personnel, volunteers, and 4-H club members. Power washer provided by the FS with the wash water and facility provided by local businesses
	Coordinate with and encourage local businesses to offer weed free hay and feed for sale to stock using recreationists during summer and fall seasons.
	Coordinate, assist and cooperate with Beaverhead County and the Nature Conservancy in the work of two interns through a grant from the National Fish and Wildlife Foundation to promote weed prevention awareness, weed identification and spray day participation among Big Hole Valley residents.
	Aggressively pursue, implement and enforce equipment and vehicle weed free standards and requirements for timber sale operations, fire suppression activities, general contractors and outfitters on the National Forest

United States Department of Agriculture

Forest Service

Beaverhead-Deerlodge National Forest

420 Barrett Street
Dillon, MT 59725-3572
(406) 683-3900

File Code: 2670
Route To: 1950

Date: April 18, 2002

Subject: Biological Assessment – Noxious Weed Control Program EIS

To: Forest Supervisor & ID Team Leader – Leaf Magnuson

Project Name: Beaverhead-Deerlodge National Forest

Prepared By: James A. Brammer

Date Prepared: April 15, 2002

Introduction

On July 10, 1998, the United States Fish and Wildlife Service (USFWS) listed bull trout as a Threatened Species within the Columbia River Basin. Section 7(a)(2) of the Endangered Species Act (ESA) of 1973 as amended, requires all federal agencies to review actions authorized, funded, or carried out by them to ensure such actions do not jeopardize the continued existence of listed species. This biological assessment evaluates potential effects on threatened bull trout within the Columbia River Distinct Population Segment associated with application of selected herbicides on federal lands within the Beaverhead-Deerlodge National forest, Montana.

The following Biological Assessment (BA) is designed to satisfy the requirements of the Forest Service and U.S. Fish and Wildlife Service (FWS). It will provide a framework to reduce risk for negative effects on bull trout, such that impairment of suitable seasonal or permanent habitat, degradation of unoccupied habitat necessary for survival of the local population, or other adverse effects should not occur. The effect determination of the proposed activities is **may affect, not likely to adversely affect**. Activities which exceed the scope and intensity of the anticipated work described in this BA are not covered. Such projects will require separate analysis and consultation with the USFWS.

This BA consists of 11 parts:

1. Project Description
2. Action Area
3. Species Descriptions and Habitat Requirements
4. Forest Plan Standards
5. Direct, Indirect, and Cumulative Effects
6. Compliance with INFISH Riparian Management Objectives
7. Potential Effects to Species Indicators and Habitat Indicators
8. Determination
9. References Cited
10. Summary and Signature

Project Description

The Beaverhead-Deerlodge NF proposes to implement an Integrated Pest Management strategy across the Forest to control noxious and invasive weeds. This strategy consists of a coordinated effort between public and private land managers to prevent weed introduction and spread through the use of mechanical, biological and chemical weed treatment methods coupled with an education and monitoring program. Where infestations occur, weed spread prevention will be accomplished mostly through ground-based and aerial herbicide application. Treatment areas are most commonly along roads and trails, campgrounds, power-line or other right of ways, gravel/rock quarries, other administrative sites and high-risk habitat types. Considerations for treatment include assessing which weed/s is/are present; the risk that weeds will spread off site, site importance, and availability of funding.

Action Area

This Action Area for this proposal includes lands within and immediately adjacent to the Beaverhead-Deerlodge NF. Areas currently proposed for herbicide treatments in the Upper Clark Fork and Rock/Flint sub-basins, are presented by 6th code HUC in Appendix A. Data provided includes the type of treatment (aerial vs. ground application), total treatment acres proposed, and whether bull trout are present. Table 1 below, displays proposed treatments by 6th code HUC that are within 300 feet of streams supporting bull trout in the Upper Clark Fork and Rock/Flint sub-basins. All of these drainages are within the range of the Columbia River Distinct Population Segment of bull trout in Western Montana.

Table 1: Length of BULL TROUT AND TRIBUTARY streamS within 300 Feet of PROPOSED Weed treatment.

6th CODE HUC	Fish Species	Treatment Type	Stream Name	Miles of Stream w/in 300' of Weed Treatment
170102010404	Bull Trout	Aerial	LOST CR	0.23
170102020104	Bull Trout	Aerial	FLINT CR	1.26
170102020303	Bull Trout	Aerial	ROCK CR	0.25
170102020304	Bull Trout	Aerial	BOULDER CR	0.19
170102020609	Bull Trout	Aerial	HARVEY CR	0.52
170102020702	Bull Trout	Aerial	MEADOW CR	0.08
170102021004	Bull Trout	Aerial	ROCK CR, W FK	0.32
170102021203	Bull Trout	Aerial	ROCK CR	0.39
170102021204	Bull Trout	Aerial	STONY CREEK	3.32
170102010301	Bull Trout	Ground	STORM LAKE CR	0.47
170102010302	Bull Trout	Ground	CABLE CR	0.14
170102010302	Bull Trout	Ground	STORM LAKE CR	0.20
170102010302	Bull Trout	Ground	WARM SPRINGS CR	1.13
170102010304	Bull Trout	Ground	FOSTER CR	1.93
170102010305	Bull Trout	Ground	WARM SPRINGS CR	0.16
170102010404	Bull Trout	Ground	LOST CR	0.23
170102010407	Bull Trout	Ground	RACETRACK CR	0.86

6th CODE HUC	Fish Species	Treatment Type	Stream Name	Miles of Stream w/in 300' of Weed Treatment
170102010408	Bull Trout	Ground	RACETRACK CR	0.65
170102020102	Bull Trout	Ground	FLINT CR	0.03
170102020104	Bull Trout	Ground	FLINT CR	2.18
170102020301	Bull Trout	Ground	BOULDER CR	1.19
170102020302	Bull Trout	Ground	BOULDER CR	1.44
170102020302	Bull Trout	Ground	COPPER CR	0.04
170102020303	Bull Trout	Ground	BOULDER CR	0.13
170102020303	Bull Trout	Ground	SOUTH BOULDER CR	0.96
170102020304	Bull Trout	Ground	BOULDER CR	2.59
170102020609	Bull Trout	Ground	HARVEY CR	2.62
170102020702	Bull Trout	Ground	MEADOW CR	1.72
170102020703	Bull Trout	Ground	TRIB, ROCK CREEK, EF	0.17
170102020703	Bull Trout	Ground	ROCK CR, E FK	0.02
170102020704	Bull Trout	Ground	ROCK CR, E FK	0.44
170102020804	Bull Trout	Ground	TRIB COPPER CR	0.51
170102020804	Bull Trout	Ground	COPPER CR	1.66
170102020804	Bull Trout	Ground	GREEN CANYON CR	0.25
170102020804	Bull Trout	Ground	ROCK CR, M FK	0.16
170102020805	Bull Trout	Ground	ROCK CR, M FK	1.06
170102021003	Bull Trout	Ground	ROCK CR, N FK	0.25
170102021003	Bull Trout	Ground	ROCK CR, W FK	3.87
170102021004	Bull Trout	Ground	ROCK CR, W FK	2.57
170102021203	Bull Trout	Ground	ROCK CR	0.85
170102021204	Bull Trout	Ground	ROCK CR	0.07
170102021204	Bull Trout	Ground	STONY CR	3.27
170102021205	Bull Trout	Ground	ROCK CR	0.07

Species Descriptions and Habitat Requirements

The following discussion of bull trout habitat requirements in Montana is taken from MBTSG 1998. The majority of migratory bull trout spawning in Montana occurs in a small percentage of the total stream habitat available. Spawning takes place between late August and early November, principally in third and fourth order streams. Spawning adults use low gradient areas (< 2%) of gravel/cobble substrate with water depths between 0.1 and 0.6 m and velocities from 0.1 to 0.6 m/s. Proximity of cover for the adult fish before and during spawning is an important habitat component. Spawning tends to be concentrated in reaches influenced by groundwater where temperature and flow conditions may be more stable. The relationship between groundwater exchange and migratory bull trout spawning requires more investigation. Spawning habitat requirements of resident bull trout are poorly documented.

Successful incubation of bull trout embryos requires water temperatures below 8o C, less than 35-40% of sediments smaller than 6.35 mm in diameter, and high gravel permeability. Eggs are deposited as deep as 25.0 cm below the streambed surface and the incubation period varies depending on water temperature. Spawning adults alter streambed characteristics during redd construction to improve survival of embryos, but conditions in redds often degrade during the incubation period. Mortality of eggs or fry can be caused by scouring during high flows, freezing during low flows, superimposition of redds, or deposition of fine sediments or organic materials. A significant inverse relationship exists between the percentage of fine sediment in the incubation environment and bull trout survival to emergence. Entombment appeared to be the largest mortality factor in incubation studies in the Flathead drainage. Groundwater influence plays a large role in embryo development and survival by mitigating mortality factors.

Rearing habitat requirements for juvenile bull trout include cold summer water temperatures (15 degrees C) provided by sufficient surface and groundwater flows. Warmer temperatures are associated with lower bull trout densities and can increase the risk of invasion by other species that could displace, compete with, or prey on juvenile bull trout. Juvenile bull trout are generally benthic foragers, rarely stray from cover, and they prefer complex forms of cover. High sediment levels and embeddedness can result in decreased rearing densities. Unembedded cobble/rubble substrate is preferred for cover and feeding and also provides invertebrate production. Highly variable streamflow, reduction in large woody debris, bedload movement, and other forms of channel instability can limit the distribution and abundance of juvenile bull trout. Habitat characteristics that are important for juvenile bull trout of migratory populations are also important for stream resident subadults and adults. However, stream resident adults are more strongly associated with deep pool habitats than are migratory juveniles.

Both migratory and stream-resident bull trout move in response to developmental and seasonal habitat requirements. Migratory individuals can move great distances (up to 250 km) among lakes, rivers, and tributary streams in response to spawning, rearing, and adult habitat needs. Stream-resident bull trout migrate within tributary stream networks for spawning purposes, as well as in response to changes in seasonal habitat requirements and conditions. Open migratory corridors, both within and among tributary streams, larger rivers, and lake systems are critical for maintaining bull trout populations.

Forest Plan Standards

The following standards are included in the Deerlodge NF Plan (1987); "Design management practices to keep the aquatic ecosystems, free from permanent or long-term human-caused stress"…(pg II-23); and "Provide clean water and habitat for fish by coordinating Forest activities and by direct habitat improvement"…. The Deerlodge Forest Plan was amended on August 30, 1995 by the Inland Native Fish Strategy (INFISH) (USDA Forest Service 1995). INFISH was designed to provide additional protection for native trout populations, outside the range of anadromous fish, on 22 National Forests in the Pacific Northwest, Northern and Intermountain Regions. It was deemed necessary since native species were at risk due to habitat degradation, introduction of exotic species, loss of migratory forms and over-fishing.

As part of this strategy, Regional Foresters established Riparian Management Objectives (RMOs) and Riparian Habitat Conservation Areas (RHCA). RMOs are habitat parameters that describe good fish habitat. Where site-specific data is available, these RMOs can be adjusted to better describe local stream conditions. These RMOs for stream channel conditions provide the

criteria against which attainment or progress toward attainment of riparian goals is measured. RHCAs are portions of watersheds where riparian dependent resources receive primary emphasis. The RHCAs are defined for four categories of stream or water bodies dependent on flow conditions and presence of fish. The RHCAs are areas within specific management activities are subject to standards and guidelines in INFISH in addition to existing standards and guidelines in the Helena Forest Plan. General Riparian Area Management Guideline RA-3 on page E-12 of the Infish Environmental Assessment specifies that application of herbicide will only be allowed such that it does not retard attainment of RMOs and avoids adverse effects on inland native fishes.

Direct, Indirect, and Cumulative Effects

General

A majority of the remaining bull trout strongholds, in the Columbia River drainage, exist in headwater areas on federally managed lands. These areas contain most of the important spawning and rearing habitats for fluvial and adfluvial stocks as well as remnant resident populations (Quigley et al. 1997). Headwater areas on the Beaverhead-Deerlodge National Forest in both the Rock Creek Section 7 watershed and the Upper Clark Fork/Flint Section 7 watershed are known to support bull trout. Consequently control of noxious weeds on federal lands could pose some risk to bull trout. Herbicides proposed for use include: 2,4-D, Chlorsulfuron, Clopyralid, Dicamba, Glyphosate, Haxazionone, Imazapyr, Metsulfuron methyl, Picloram, Pyridinecarboxyhlic acid sulfometuron methyl Triclopyr, Adjuvants, Surfactants, Dyes.

Direct and Indirect Effects

Risk of impacting bull trout is directly related to possible herbicide contamination of streams and lakes, and the necessity for water quality conditions to allow individuals throughout all life stages of development and maturation to remain healthy. Risk is indirectly related to effects on aquatic insects, used for food, and riparian and upslope vegetation, necessary to maintain many physical elements of desired habitat characteristics. Effects to bull trout may occur as a function of mechanical, chemical, or biological treatments of weeds. Further discussion on each element is included below.

Effects to bull trout from mechanical removal of weeds are considered discountable due to minimal ground disturbance and the limited extent it will occur. Biological control of weeds may have slight beneficial effects, albeit they are likely immeasurable. There are no negative impacts associated with biological control.

Potential negative effects to bull trout from herbicide applications, as proposed on the Beaverhead-Deerlodge Forest, is a function of several factors: 1) toxicity of those herbicides used; 2) concentrations of herbicide that reach the water (may have direct relationship with application rate); 3) duration of exposure; 4) impacts to food supply (i.e. aquatic insects); 5) Changes in riparian and upslope vegetation. Some potential for positive effects on bull trout relates to reduced erosion as weeds are replaced by native or desired non-native vegetation. The

benefit associated with replacing weeds is considered small enough to be discountable in most cases, because weeds also provide some form of vegetative cover that reduces erosion.

Toxicity of Herbicides

Mayer and Ellersieck (1986) reviewed 4,901 acute toxicity tests of over 400 herbicides stored in the database of the US Fish and Wildlife Service, to determine if there were any statistically valid trends that could be used to compare the 66 species studied. They found there is no single species, family or class that, in all cases, is most sensitive to chemicals. They agreed with the conclusions of others, that species best represent themselves and not others, but also observed it was somewhat common that insects were more sensitive to most herbicides than crustaceans, followed by fish, then amphibians (the least sensitive class). This said, it should be noted, however, insects and amphibians have been inconsistently studied making it hard to determine any pattern of statistical significance.

A number of herbicides proposed for use on the Beaverhead-Deerlodge show some potential for being toxic to bull trout, although this species has not been specifically studied. A general comparison of lethal toxicity levels (LC50) for salmonids and other aquatic species exposed to Tordon, Clopyralid, Dicamba, 2,4-D and Glyphosate is provided in Table 2 below.

Table 2: Comparison of lethal toxicity levels.

Herbicide/ Species	Exposure	LC50 mg/L	NOEL mg/L
Picloram			
Cutthroat Trout	96 hr	1.5-8.6	
Cutthroat Trout			2.9
Cutthroat Fry	22 days		0.29
Lake Trout	96 hr	1.6-4.3	
Rainbow Trout	96 hr	4-58	
Daphnia spp.	48 hr	76	
Pteronarcys spp.	96 hr	48	
Clopyralid			
Rainbow Trout	96 hr	2000	
Daphnia	48 hr	1100	
Fathead Minnow	96 hr	2900	
Bluegill	96hr	4700	
Glyphosate			
Rainbow Trout	96 hr	8-220	
Chinook salmon	96 hr	19-220	
Bluegill	96 hr	24-120	
Chum salmon	96 hr	10-202	
Coho salmon	96 hr	27-210	
Coho salmon fry	96 hr	13	
Daphnia	48 hr	85-780	

Herbicide/ Species	Exposure	LC50 mg/L	NOEL mg/L
Fathead minnow	96 hr	97	26
2,4-D			
Rainbow Trout	96 hr	15-420	
Chinook salmon	96 hr	>100	
Chorus frog	48 hr		50
Chorus frog	24 hr	100	
Fathead minnow	96 hr	335-800	
Midge spp.	96 hr	100-405	
Pteronarcys spp.	96 hr	15	
Bluegill	96 hr	100-335	
Bluegill	8 days		5
Dicamba			
Rainbow Trout	96 hr	28	
Bluegill	96 hr	>50 – 135	
Daphnia	96 hr	> 96	
Gammarus spp.	96 hr	>100	

From Table 2, a couple of observations can be made: 1) Trout seem to show a greater propensity for being affected than other fish; and 2) Picloram seems to be relatively more toxic to all aquatic species tested than any of the other herbicides – with the possible exception of the stonefly Pteronarcys when exposed to 2,4-D. With this in mind picloram is used as a surrogate for all herbicides to assess risks to bull trout in this biological assessment. The acute toxicity of picloram varies depending on the formulation used and the species involved. Some salmonids have been found to have substantial tolerance to Tordon 22K (brook and brown trout with 96 hr LC-50s of 91 and 52 ppm, respectively). Cutthroat and lake trout exhibited much greater sensitivity in laboratory tests (96 hr LC50s of 1.5 - 8.6 mg/L). Tolerance can be affected by a number of things such as water chemistry (water hardness, temperature, pH) duration of exposure to the chemical and the developmental stage (i.e. egg, fry, fingerling or adult). Chronic effects to some salmonids become evident at much lower concentrations than the LC-50 values shown above, but the exposure period is much longer.

Establishment of a "safe" concentration level

For this biological assessment, selection of a "safe" concentration level (to assess potential effects of picloram on bull trut) follows recommendations presented in the Level 1 Team Briefing on Forest Herbicide Application, (March 21, 1999). The "safe" concentration level chosen is synonymous with a "maximum allowable toxicant concentration" or MATC equaling 0.12 ppm. This value was derived by taking 1/25 of 3.0 ppm (the 96 hour LC-50 for rainbow trout).

Determining levels of Picloram that may reach surface waters

Rational used to determine levels of picloram that could reach surface water parallels recommendations used in the Level 1 Team Briefing on Forest Herbicide Application, (March 21, 1999). The amount of herbicide reaching surface water depends on the ratio of runoff dominant and infiltration dominant conditions and the total amount of herbicide applied within a drainage. It was assumed 6% of the herbicide applied to runoff dominant sites could reach surface water should an intense storm occur shortly after application. On infiltration dominant sites, 1% of the herbicide applied was deemed possible to enter surface water through subterranean flow.

Ratio of run-off versus infiltration dominant sites

Variability in site-specific conditions across the Forest is extremely difficult to accurately assess within a broad-scale analysis. To simplify, a very conservative, standardized approach was used - assuming 50% of all areas treated would be runoff dominant and 50% would be infiltration dominant. This should be – in nearly all cases – an overestimate of runoff type situations.

Application rates for picloram

Although picloram is most often applied in Forest Service programs as the sole herbicide, it is also applied in combination with 2,4-D and less commonly with other herbicides. The most common methods of ground application for Tordon (active ingredient = picloram) involve backpack (selective foliar) and boom spray (broadcast foliar) operations. Labeled application rates for picloram range from 0.13 to 1.5 lb a.e./acre. However, the Forest Service typically uses rates in the lower part of this range -i.e., 0.3 to 0.56 lb a.e./acre. (Ecological Risk Assessment – USDA FS, 2001?).

For this analysis, application rates of 0.5 lb Picloram/acre was used to model potential delivery of active ingredient to water bodies. Based on summary data from the Forest described above, these represent rates occurring on only 5% of the acres treated. High-end values for picloram (which has the greatest potential, of the herbicides we use, to impact aquatic organisms) were intentionally chosen to evaluate threats to bull trout. If these rates seem to pose little risk, then treatments should be able to be broadly implemented without varying mitigations designed specifically for individual sites.

Duration of Exposure

The difficulty in assessing risk to fish is that testing procedures used in the lab do not match what happens in the field. A typical field situation would be where fish may be exposed once or twice over a summer to certain concentrations of an herbicide, but only for a few hours. A lab situation also excludes the potential for individuals to reduce exposure by moving. In the field, the risk of contamination is generally linked to the first storm following application, which generates overland flow. Herbicide concentrations in streams generally peak in a 4 to 6 hour

period, following the runoff-generating event. Thus, for this analysis, elevated stream flows and herbicide delivery generated from storm events are evaluated over a 6-hour period.

Model used for Risk Assessment:

Step 1: Determine P, the total amount of herbicide to be applied in a watershed.

P (lbs) = R (lbs/ac) x A (ac) where R is the application rate of active ingredient and A is the total acreage treated.

For picloram, we used a standardized rate of 0.5 lbs active ingredient/acre (see discussion above).

Step 2: Determine percent of treated area that will produce overland flow or allow infiltration.

It was assumed 50% of all areas treated would be runoff dominant and 50% would be infiltration dominant. See discussion above.

Step 3: Determine Y, the maximum yield in pounds of herbicide that could potentially reach surface waters.

For the purposes of this analysis, 6% for runoff dominant (50% of the acres treated) and 1% for infiltration dominant (50% of the acres treated) were used.

Y (lbs) = (P/2) x D1 + (P/2) X D2 Where D1 is the delivery ratio for overland flow dominant sites (0.06) and D2 is the delivery ratio for infiltration dominant sites (0.01).

Step 4: Define the concentration level necessary to prevent impacts to bull trout.

For the purposes of this analysis 0.12 parts per million were used.

Step 5: Determine the minimum amount of water F (ultimately expressed in lbs) necessary to dilute the herbicide delivered to the stream to meet a targeted "safe" concentration of 0.12 ppm (1.2 X 10 –7).

Y (lbs) / 0.00000012 (lbs) = F (cf/sec) x 62.43 lbs/cf x T (sec) where F, the flow rate of the stream is expressed in cubic feet per second, and T denotes the estimated delivery time in seconds which overland and infiltration derived flows would be yielding herbicide. A cubic foot of water weighs 62.43 pounds. The delivery period for over land flow dominated systems is assumed to be six hours (21,600 sec).

Step 6

Determine discharges for storm related events using equations from Water Resources Investigation Report 92-4048 (US Geological Survey 1992). The Flint and Rock Creek

drainages fall within the West Region when calculating flood-frequency discharges based on drainage –basin characteristics. All remaining areas on the Forest fall within the Southwest Region. Different regression equations are used for each region. All equations use drainage area as a common factor influencing discharge.

The following standardizations and assumptions were made:

1) In the Flint and Rock Creek drainages, P (the average annual precipitation) in ranged from 27 – 35 inches/year based on 3 gauge sites. A single value of 34 inches/year was used in the model to calculate storm discharges.
2) In the Southwest Region HE (percent of area within the drainage above 6000 feet elevation). The Forest Boundary on the B-D in the SW region is almost always above 6000 feet. This value was standardized at 100% for the purposes of this model.

Step 7

Compare stream flows needed to provide adequate dilution F with storm event discharges calculated for individual 6th code HUCs.

Two year, 5 year, 10 year, 25 year, 50 year and 100-year storm event discharges were calculated for each HUC where herbicide treatment is proposed. In all cases, discharges for the smallest calculated storm events (2 year), when calculated for the entire acreage of the HUC, exceeded the amount of water necessary to meet the targeted "safe" concentration levels of picloram. See spreadsheets attached in Appendix A.

It seems unreasonable, however, to presume that a storm would always be extensive enough or perfectly positioned to encompass the entire drainage. The potential for isolated storm cells to develop, which produce intense rain showers within a small area, is always present. This possibility effectively reduces the drainage area that should be used to calculate storm event discharges from the total acreage within a HUC to the area directly covered by a potential storm. Thus, additional standardizations and assumptions were made:

1) If we are evaluating risk based on isolated storm cells, it is unlikely that large (25 – 100 year) storm events would occur. For the purposes of this model, the equation to calculate 2-year storm events (approximating bank full flows) was used as a standard.
2) The area that might potentially be covered by a small, isolated storm cell was considered and standardized at 3,840 acres (6 square miles).
3) For the purposes of this model, Two-year storm related discharges were calculated for all HUCs, based on a drainage area of 6 square miles.

<u>Analysis Results</u>

There is no information available, regarding effects of these herbicides on bull trout. Tordon 22K was used as the indicator of risk to bull trout as it appears to be more toxic at lower concentrations to salmonid species tested.

Using procedures outlined in the analysis above, extreme concentrations would never occur during Beaverhead-Deerlodge Forest weed spraying activities, unless a spill occurred directly into a stream from something like a vehicle accident. Proposed treatments may still result in small amounts of herbicide entering waters of some 6th code HUCs where weed spraying occurs. The model indicates herbicide applications in all but a few 6th code HUCs on the Forest should remain well below "safe" concentrations and pose little risk to bull trout. This assumes project implementation and mitigation described in the EIS are followed.

Results from the model do indicate treatments proposed for weeds within 37, 6th code HUCs across the Forest, show some risk for exceeding "safe" concentrations in surface waters. Within 16 of these HUCs, modeled concentration levels exceed the safe concentration by 35% or less. In actuality, instream concentrations should remain below 0.12 ppm and impacts to TES or other aquatic species should not occur. Mitigation measures defined in the EIS provide significant protection and all standardized values used in the model, were extremely conservative. In one example of this, the model presumes a storm event will occur immediately after application, which produces significant overland flow. In reality, the likelihood that an isolated, intense storm will occur right after extensive herbicide application and center itself on the treated area is low. Observation of a weather forecast is required prior to aerial application. Using weather forecasts to guide weed treatment, should effectively reduce the concentrations delivered to streams by another 10 to 50%, provided forecasts are relatively accurate out to at least 2 or 3 days. Based on results from Watson, Rice and Monnig (1989) photo-decay of Picloram ranged from 22 to 44% within 7 days. The following rational further supports the likelihood that impacts to aquatic species within those HUCs will be avoided

1) Most range and forest-lands represent infiltration dominant sites rather than overland runoff sites. The model was standardized to say that 50% of every site is run-off dominant. This should compensate for ephemeral channels that may be treated during broad aerial treatments, and other areas where site-specific conditions might encourage delivery.
2) A 6% delivery of herbicide during overland runoff events represents the upper end of what has been documented through the literature.
3) A 300-foot buffer maintained for aerial spraying will function help intercept water and allow added infiltration should precipitation events occur.
4) Stream flows increase as they travel down drainage, decreasing concentrations and further detoxifying chemicals.
5) Ground spraying within 15 feet of bull trout or westslope cutthroat streams is excluded. Herbicide application is limited to techniques that do not require spraying, such as wiping, wicking, painting, etc.
6) Exposure to herbicides in the field would typically be only a fraction of the time organisms are exposed during 96-hour acute toxicity LC-50 tests in the lab.
7) The "safety threshold" chosen for this analysis is the most conservative recommended.
8) Aerial treatment will not occur within 300 feet of a stream, lake or water body, which supports Westslope cutthroat, bull trout or other species of special consideration.
9) The ecological risk assessment for picloram made a relatively broad assumption that runoff into surface water is unlikely in relatively arid areas -i.e., annual rainfall of less than 10 inches. This statement was qualified to some extent by saying "some runoff could occur during unusually severe rainfalls, at least at sites with high runoff potential".

10) The analysis is extremely conservative and does not account for the capability of aquatic organisms to move out of contaminated stream reaches.

Within 21 HUCs, (based on the modeled results) there remains some level of risk that concentrations could exceed "safe" levels. Of those, 8 HUCs support bull trout, in these HUCs additional mitigation for herbicide application follows:

Use of Tordon 22K will not exceed application of 335 lbs of the active ingredient picloram, within a 12 month period, in each of the following 6th code watersheds; Stony, Gird, Boulder Low, South Boulder, and Middle Fork Rock and FlintSimilarly, use of Tordon 22k will not exceed application of 225 lbs of the active ingredient picloram, within a 12-month period, in the Lost Flint and Tin Can Gulch 6th code watersheds. If treatment in any watershed is necessary, beyond the allowable amount of picloram, another herbicide will be used such that effects on bull trout, Westslope cutthroat trout and other sensitive aquatic species will be discountable.

Table 3. List eight 6th code HUCs where the model predicted picloram concentrations might exceed 0.12 parts per million, should a 2 year storm event create runoff from the treated area

6th HUC	Name	Total Acres	Acres Treated	Lbs Picloram Applied @ .5 lbs/acre	Estimated Lbs Picloram Delivered to stream	CFS required @ 6% overland delivery	2 year storm event discharge (cfs) for 3840 acres	Max. amt of Picloram allowed for application to meet MATC
170102021204	Stony	21678	1051.5	525.76	17.8	109.9	43	335
170102020502	Gird	20772	862.6	430.81	15.1	93.2	43	335
170102020304	Boulder Low	12270	818.8	409.49	14.4	88.5	43	335
170102020303	South Boulder	13355	1025.2	513.62	17.9	110.8	43	335
170102020204	Middle Fork Rock	13262	736.3	368.15	12.9	79.6	43	335
170102020104	Flint	8446	557.79	278.9	9.7	60.3	43	335
170102010404	Lost Creek	31111	1523	761.48	9.7	60.3	29	225
170102010305	West Valley	30536	831.8	415.88	14.6	90	29	225

Note: Data includes the total acres within each HUC, acres proposed for treatment, estimated total lbs of picloram that would be applied without any restrictions, estimated lbs of picloram that could be delivered to the stream, stream discharge in CFS required to dilute picloram (delivered to stream) sufficiently to meet 0.12 ppm, estimated 2 year storm event discharges for an area covering 3840 acres (6 miles square), and the Maximum amount of picloram that could be applied while ensuring 0.12 ppm would be met, based on the model.

Additional Mitigations Significant to this Analysis

1) All herbicide storage, mixing, and post-application equipment cleaning is completed in such a manner as to prevent the potential contamination of any Riparian Habitat Conservation Area, perennial or intermittent waterway, unprotected ephemeral water-way or wetland.

2) Helicopter service landings or fuel storage is prohibited within 300 feet of fish bearing streams and lakes, 150 feet of other perennial streams, or 100 feet of intermittent streams, springs, seeps, wetlands, or ponds.
3) Herbicide applicators shall carry spill containment equipment, be familiar with and carry an Herbicide Emergency Spill Plan.
4) No ester formulations of herbicides will be used.

Low levels of picloram that may reach streams on the Forest should only persist for a very short time period. This would generally last less than one day (an estimated 6 hours) during and following a rainstorm sufficient to result in overland flow.Based on mitigations limiting the total amount of picloram that can be applied to the HUCs listed in Table 3, and other mitigations listed immediately above, it is concluded risk to bull trout is low enough to be considered discountable. The potential for negative effects to aquatic insects that are a food source to bull trout is very limited since the data suggests limited impacts occur with exposure to of Tordon, dicamba, 2-4D, or chlopyralid at concentrations projected to occur in streams. Negative effects to some aquatic insect species may occur on a localized basis. However, rapid re-colonization from upstream areas should occur, reducing risk for indirect adverse effects to bull trout. Thus, indirect effects to bull trout from changes in food supply should be discountable.

Picloram can damage to non-target plant species. As is the case with any herbicide, impacts to non-target plant species is related directly to differences between sensitivities of target and non-target species. Although picloram is more toxic to broadleaf plants direct spray at application rates between 0.3 and 1.5 lb a.e./acre can kill a host of other terrestrial plants. The potential to affect non-target species helps define application rates. It is unlikely, considering application rates used in the past; that upland and riparian vegetation will be altered to an extent that is measurable. Thus, indirect effects on bull trout are considered discountable.

Cumulative Effects

A wide variety of land management activities continue on private lands in western Montana. Projects on private lands may pose risks to bull trout through a variety of pathways. The extent of impact varies and is generally unpredictable. They may be decline in the future through habitat conservation planning for bull trout on non-federal lands or project specific mitigation by private landowners. Coordination o spraying activities between the Forest Service and private landowners should help ensure that conditions described in this BA are met.

In many of the drainages there will be weed treatments by private landowners. Modeled treatments with herbicides suggest any concentrations that reach streams will likely remain well below levels where acute or adverse effects to the bull trout would occur. The likely-hood of affecting bull trout growth and survival on federal lands is discountable due to safe concentrations and a short duration of exposure.

Potential Effects to Species Indicators and Habitat Indicators

Note that only one matrix is submitted for all the HUCs. Since the potential effect to each parameter is the same in each, the effects should not vary enough to discuss individually.

<u>Species Indicators</u>: the project proposal is not expected to significantly change any of the species indicator ratings from baseline conditions.

1) Subpopulation Size: *Maintain*

2) Growth & Survival: *Maintain*. Use of herbicides has the potential to affect all life stages of bull trout, but the highest risk is for the egg and fry stage. With mitigation measures being followed the risk is considered negligible and discountable

3) Life History Diversity & Isolation: *Maintain*

4) Persistence and Genetic Integrity: *Maintain*

<u>Habitat Indicators</u>: Only the parameters affected by the project proposal are discussed

1) Temperature: *Maintain.* Temperature will not be affected by loss of streamside vegetation associated with weed spraying as streamside trees and shrubs will not be targeted with herbicide treatments.

2) Sediment: *Maintain.* As discussed in the EIS, there may be slight benefits with reductions in weed abundance and associated decreases in sediment delivery to streams. However, benefits to fisheries will likely be immeasurable in most circumstances.

3) Chemical Contamination/Nutrients: *Degrade.* There is some risk of herbicide application affecting bull trout in terms of growth and/or survival should significant amounts of certain chemicals reach streams. High intensity storm events have the greatest potential to create overland flow and deliver herbicide to streams. If mitigation measures and label precautions are adhered to, chances are extremely low that bull trout would be affected, since herbicide concentrations and exposure duration would be significantly below what has been shown to cause mortality (see narrative section on direct, indirect and cumulative effects for more detail). Overall the call is slight degrade for all of the HUCs that receive herbicide application.

4) Physical Barriers: *Maintain*

5) Substrate Embeddedness: *Maintain*. Same rationale as sediment

6) Large Woody Debris: *Maintain*

7) Pool Frequency & Quality: *Maintain*

8) Large Pools: *Maintain*

9) Off-Channel Habitat: *Maintain*

10) Refugia: *Maintain*

11) Wetted Width/Max Depth Ratio: *Maintain*

12) Streambank Condition: *Maintain*

13) Floodplain Connectivity: *Maintain*

14) Change in Peak/Base Flows: *Maintain*

15) Drainage network Increase: *Maintain*

16) Road Density & Location: *Maintain*

17) Disturbance History: *Maintain*

18) Riparian Conservation Area: *Maintain*

19) Disturbance Regime: *Maintain*

Integration of Species and Habitat Conditions: *Maintain.* Project planning and application of the mitigation measures should prevent herbicides from reaching streams. While certain situations could still allow contamination to occur, chemical concentrations and duration of exposure will be significantly below levels shown to cause mortality. Thus, there is a very small risk of affecting the bull trout in terms of survival.

Compliance with INFISH

No INFISH Riparian Management Objective (RMO) will be affected with the proposal to treat weeds on the Beaverhead-Deerlodge Forest. Chemical contamination to stream waters has some potential for affecting bull trout, but is not included as a RMO for INFISH. With this in mind, INFISH does call for applying herbicides in a manner that does not retard or prevent attainment of RMOs and avoids adverse effects on inland native fish. Herbicide treatments consistent with label direction and implementation of the mitigation measures as stated in the EIS, meet this intent.

Determination

Application of herbicides meeting the project description and mitigation requirements in this BA will result in inconsequential or discountable effects to bull trout and are determined to **May Affect, Not Likely to Adversely Affect** bull trout populations. The level of effects is determined for application of herbicides as addressed throughout this BA and by full consideration of project evaluation criteria and application of mitigation measures discussed earlier. If the level of effects from any activity are more than inconsequential or discountable or do not fully meet the intent of this BA, then the project will be addressed in a separate biological assessment.

LITERATURE CITED

MBTSG (Montana Bull Trout Scientific Group). 1996b. The role of fish stocking in bull trout recovery. Report prepared for the Montana Bull Trout Restoration Team, Helena, Montana.

Mayer, F. L. and M. R. Ellersieck. 1986. Manual of acute toxicity: interpretation and database for 410 chemicals and 66 species of freshwater animals. Resource Publication 160. U.S. Dept. of Interior, Fish and Wildlife Service. Washington D.C.

Omang R. J. 1992. Analysis of the magnitude and frequency of floods and the peek-flow gaging network in Montana. United States Geological Survey, Water Resources Investigations Report 92-4048. Helena, MT

U.S. Department of Agriculture (USDA), Forest Service. 1987. Forest Plan, Deerlodge National Forest. United States Department of Agriculture, Forest Service, Deerlodge National Forest, Helena, Montana.

U.S. Department of Agriculture (USDA), Forest Service. 1995. Inland Native Fish Strategy. Environmental Assessment. Decision Notice and Finding of No Significant Impact. Intermountain, Northern and Pacific Northwest Regions, Forest Service. United States Department of Agriculture.

Watson, V.J., P.M. Rice and E.C. Monnig. 1989. Environmental fate of picloram used for roadside weed control. Journal of Environmental Quality 18:198-205.
Whisenant, S.G. 1990. Changing fire frequencies on Idaho's Snake River Plains.

SUMMARY AND SIGNATURE

Listed Fish Species	Determination of Effects	Potential for Incidental Take?
Bull Trout	NLAA	No

Possible determination of effects on listed fish species:

NE = No Effect

NLAA = May Affect - Not Likely to Adversely Affect

LAA = May Affect - Likely to Adversely Affect

Prepared by: \s\ Jim Brammer Ammended: 5/18/02

Jim Brammer, Fisheries Biologist
Beaverhead-Deerlodge National Forest

APPENDIX A

PROPOSED TREATMENT AREAS BY 6TH CODE HUC IN THE UPPER CLARK FORK – FLINT AND ROCK CREEK SECTION 7 WATERSHEDS

PROPOSED TREATMENT AREAS BY 6TH CODE HUC

DIST	HUC 6CODE	NAME	Total HUC Acres	Square miles	BT Present	Cutt Present	Treatment	Acres Treated
d8	170102021205	WindlassGulch	14709	22.98	yes	0	Aerial	33.1
d8	170102021205	WindlassGulch	14709	22.98	yes	0	Ground	6.2
d8	170102021204	Stony	21678	33.87	yes	0	Aerial	1016.1
d8	170102021204	Stony	21678	33.87	yes	0	Ground	35.4
d8	170102021203	CornishGulch	11139	17.40	yes	0	Aerial	330.9
d8	170102021203	CornishGulch	11139	17.40	yes	0	Ground	168.3
d8	170102021202	SluiceGulch	16102	25.16	yes	0	Aerial	426.8
d8	170102021202	SluiceGulch	16102	25.16	yes	0	Ground	25.4
d8	170102021201	Antelope	16876	26.37	yes	0	Ground	2.5
d8	170102021103	ScotchmanGulch	19264	30.10	0	Yes	Ground	47.6
d8	170102021004	NFRockLow	22787	35.60	yes	0	Ground	400.5
d8	170102021004	NFRockLow	22787	35.60	yes	0	Aerial	86.1
d8	170102021003	NFRockUp	12072	18.86	yes	0	Ground	29.8
d8	170102020903	RockUp	13748	21.48	yes	0	Ground	11.0
d8	170102020902	SFRoss	19983	31.22	yes	0	Ground	0.7
d8	170102020901	Ross	20517	32.06	yes	0	Ground	0.1
d8	170102020805	MFRockLow	20785	32.48	yes	0	Ground	182.8
d8	170102020804	MFRock	13956	21.81	yes	0	Ground	91.1
d8	170102020803	Carpp	11250	17.58	yes	0	Ground	14.4
d8	170102020802	Copper-APWild	17767	27.76	yes	0	Ground	34.9
d8	170102020704	EFRockLow	11920	18.63	yes	0	Ground	42.4
d8	170102020704	EFRockLow	11920	18.63	yes	0	Aerial	13.6
d8	170102020703	EFRockMid	7812	12.21	yes	0	Ground	48.5
d8	170102020702	Meadow-Pburg	14955	23.37	yes	0	Aerial	146.6
d8	170102020702	Meadow Pburg	14955	23.37	yes	0	Ground	117.5
d8	170102020612		13607	21.26	yes	0	Aerial	41.5
d8	170102020612		13607	21.26	yes	0	Ground	11.5
d8	170102020609	0	25555	39.93	0	0	Aerial	1002.5
d8	170102020609	0	25555	39.93	0	0	Ground	339.6
d8	170102020504	Gaskill	13970	21.83	yes	0	Aerial	105.2
d8	170102020504	Gaskill	13970	21.83	yes	0	Ground	31.8
d8	170102020502	Gird	20772	32.46	yes	Yes	Aerial	462.0
d8	170102020502	Gird	20772	32.46	yes	Yes	Ground	399.6
d8	170102020501	Henderson	19288	30.14	0	0	Aerial	1155.5
d8	170102020501	Henderson	19288	30.14	0	0	Ground	618.1
d8	170102020403	0	19145	29.91	0	0	Aerial	322.9
d8	170102020403	0	19145	29.91	0	0	Ground	122.8
d8	170102020402	Cottonwood	10868	16.98	0	0	Aerial	69.4
d8	170102020401	SFWillow	15158	23.68	0	0	Ground	33.4
d8	170102020304	BoulderLow	12270	19.17	yes	0	Ground	717.6

DIST	HUC 6CODE	NAME	Total HUC Acres	Square miles	BT Present	Cutt Present	Treatment	Acres Treated
d8	170102020304	BoulderLow	12270	19.17	yes	0	Aerial	101.2
d8	170102020303	SBoulder	13355	20.87	yes	0	Ground	738.2
d8	170102020303	SBoulder	13355	20.87	yes	0	Aerial	287.0
d8	170102020302	Copper -Boulder	9642	15.07	yes	0	Aerial	42.3
d8	170102020302	Copper-Boulder	9642	15.07	yes	0	Ground	22.2
d8	170102020301	BoulderUp	9736	15.21	yes	0	Ground	54.5
d8	170102020204	RockMid	13262	20.72	yes	0	Aerial	573.2
d8	170102020204	RockMid	13262	20.72	yes	0	Ground	163.1
d8	170102020203	Marshall	16268	25.42	yes	0	Ground	185.6
d8	170102020203	Marshall	16268	25.42	yes	0	Aerial	69.3
d8	170102020202	StewartGulch	23179	36.22	yes	0	Ground	67.7
d8	170102020202	StewartGulch	23179	36.22	yes	0	Aerial	36.6
d8	170102020201	FredBurr	15614	24.40	yes	0	Ground	24.1
d8	170102020104	Flint	8446	13.20	yes	0	Aerial	424.4
d8	170102020104	Flint	8446	13.20	yes	0	Ground	133.4
d8	170102020103	LittleTrout	22489	35.14	0	0	Ground	6.8
d8	170102020102	GeorgetownLake	22185	34.66	yes	0	Ground	102.3
d8	170102020101	NFFlint	10269	16.05	0	0	Ground	22.5
d8	170102010907	Dunkleberg	24621	38.47	0	yes	Ground	166.4
d8	170102010907	Dunkleberg	24621	38.47	0	yes	Aerial	86.4
d8	170102010904	Gold-Deerlodge	49505	77.35	0	yes	Ground	424.9
d8	170102010902	RockCreekLake	42465	66.35	0	0	Ground	92.9
d8	170102010506	Fred	40449	63.20	0	yes	Ground	421.4
d8	170102010505	SAmerica	23346	36.48	0	0	Ground	2.6
d8	170102010504	Preterson	19999	31.25	0	0	Ground	173.0
d8	170102010502	Dempsey	23034	35.99	0	yes	Ground	51.4
d8	170102010501	Orofino	12879	20.12	0	0	Aerial	94.8
d7	170102010501	Orofino	12879	20.12	0	0	Ground	55.6
d8	170102010408	Bielenberg	15185	23.73	yes	0	Ground	273.2
d8	170102010407	Racetrack	25741	40.22	yes	0	Ground	103.1
d8	170102010406	Cottonwood -Helena	22290	34.83	0	0	Ground	181.6
d8	170102010406	Cottonwood-Helena	22290	34.83	0	0	Aerial	138.2
d8	170102010404	Lost-Flints	31111	48.61	yes	0	Aerial	1469.4
d8	170102010404	Lost-Flints	31111	48.61	yes	0	Ground	53.6
d4	170102010403	GirardGulch	19464	30.41	0	0	Ground	257.8
d8	170102010403	GirardGulch	19464	30.41	0	0	Aerial	106.2
d8	170102010306	Glover	12048	18.83	yes	0	Ground	41.5
d8	170102010305	TinCanGulch	30536	47.71	yes	0	Aerial	465.9
d8	170102010305	TinCanGulch	30536	47.71	yes	0	Ground	365.9
d8	170102010304	Foster	14566	22.76	yes	0	Ground	125.4
d8	170102010302	Warm Springs	16627	25.98	yes	yes	Ground	88.2

Beaverhead-Deerlodge National Forest
Noxious Weed Control Program

DIST	HUC 6CODE	NAME	Total HUC Acres	Square miles	BT Present	Cutt Present	Treatment	Acres Treated
d8	170102010301	SilverLake	9273	14.49	yes	0	Ground	18.0
d4	170102010206	Gregson	29741	46.47	0	0	Aerial	161.1
d4	170102010205	GermanGulch	26272	41.05	0	yes	Ground	178.8
d4	170102010205	GermanGulch	26272	41.05	0	yes	Aerial	146.8
d4	170102010204	Divide-ClarkFk	36539	57.09	0	0	Ground	227.4
d4	170102010203	Butte	32909	51.42	0	0	Ground	13.4
d4	170102010202	Blacktail	24628	38.48	0	0	Aerial	327.1
d4	170102010202	Blacktail	24628	38.48	0	0	Ground	253.7
d4	170102010201	Basin-Butte	31355	48.99	0	0	Ground	80.2
d4	170102010103	BrownsGulchLow	20064	31.35	0	0	Aerial	223.7
d4	170102010103	BrownsGulchLow	20064	31.35	0	0	Ground	35.2
d4	170102010102	ColumbusGulch	16126	25.20	0	0	Ground	48.4
d8	170102010101	BrownsGulch	18341	28.66	0	0	Ground	148.3

APPENDIX B

LIST OF 6TH CODE HUCs WHERE MODELING PREDICTED 2 YEAR STORM EVENTS ARE INSUFFICIENT TO PROVIDE ADEQUATE DILUTION OF PICLORAM TO MEET 0.12 PPM

TWO-YEAR STORM EVENT DISCHARGE COMPARISON

HUC 6 CODE	NAME	Total HUC Acres	square miles	TREATMENT	Acres Treated	Total App in lbs of Tordon	lbs Tordon Deliver to stream	CFS REQUIRED @ 6% OVERLAND DEL. @ .5 LBS/ACRE	2 YR STORM EVENT DIS-CHARGE (CFS)	USGS FLOW EVENT MODEL ZONE
170102010404	Lost Creek	31111	48.61	Aerial	1469.4	734.70	25.7	158.9		Southwest
170102010404	Lost Creek	31111	48.61	Ground	53.6	26.78	0.9	5.8		Southwest
	Lost Creek Total							164.7	29	
170102010305	West Valley	30536	47.71	Aerial	465.9	232.95	8.2	50.4		Southwest
170102010305	West Valley	30536	47.71	Ground	365.9	182.93	6.4	39.6		Southwest
	West Valley Total							90	29	
170102010904	Gold*-Deerlodge	49505	77.35	Ground	424.9	212.45	7.4	46.0		Southwest
	Gold*-Deerlodge Total							46.0	29	
170102010506	Fred	40449	63.20	Ground	421.4	210.71	7.4	45.6		Southwest
	Fred Total							45.6	29	
170102010205	GermanGulch*	26272	41.05	Aerial	146.8	73.40	2.6	15.9		Southwest
170102010205	GermanGulch*	26272	41.05	Ground	178.8	89.39	3.1	19.3		Southwest
	GermanGulch*							35.2	29	
100200040602	Johnson-Bighole	26369	41.20	Aerial	62.3	31.15	1.1	6.7		Southwest
100200040602	Johnson-Bighole	26369	41.20	Ground	306.6	153.30	5.4	33.2		Southwest
	Johnson-Bighole							39.9	29	
100200040401	UpperTrail	16759	26.19	Aerial	35.20	17.60	0.6	3.8		
100200040401	UpperTrail	16759	26.19	Ground	248.55	124.28	4.3	26.9		
	UpperTrail Total							30.7	29	Southwest
170102010406	Cottonwood-Helena	22290	34.83	Aerial	138.2	69.10	2.4	14.9		Southwest
170102010406	Cottonwood-Helena	22290	34.83	Ground	181.6	90.80	3.2	19.6		Southwest
	Cottonwood-Helena Total							34.5	29	
170102010403	GirardGulch*	19464	30.41	Aerial	106.2	53.10	1.9	11.5		Southwest
170102010403	GirardGulch*	19464	30.41	Ground	257.8	128.90	4.5	27.9		Southwest
	GirardGulch Total							39.4	29	

HUC 6 CODE	NAME	Total HUC Acres	square miles	TREATMENT	Acres Treated	Total App in lbs of Tordon	lbs Tordon Deliver to stream	CFS REQUIRED @ 6% OVERLAND DEL. @ .5 LBS/ACRE	2 YR STORM EVENT DIS-CHARGE (CFS)	USGS FLOW EVENT MODEL ZONE
170102010202	Blacktail*	24628	38.48	Aerial	327.1	163.55	5.7	35.4		Southwest
170102010202	Blacktail*	24628	38.48	Ground	253.7	126.85	4.4	27.4		Southwest
	Blacktail Total							62.8	29	
100200070701	Antelope	14456	22.59	Ground	321.0	160.49	5.6	34.7		Southwest
	Antelope Total							34.7	29	
100200060503	BouderMid*	35203	55.00	Aerial	794.1	397.05	13.9	85.9		Southwest
100200060503	BouderMid*	35203	55.00	Ground	59.3	29.64	1.0	6.4		Southwest
	BouderMid Total							92.3	29	
100200060502	Elkhorn	24413	38.15	Aerial	551.2	275.60	9.6	59.6		Southwest
100200060502	Elkhorn	24413	38.15	Ground	240.7	120.37	4.2	26.0		Southwest
	Elkhorn Total							85.6	29	
100200060402	NFLittleBoulder	11796	18.43	Aerial	178.5	89.25	3.1	19.3		Southwest
100200060402	NFLittleBoulder	11796	18.43	Ground	134.6	67.31	2.4	14.6		Southwest
	NFLittleBoulder Total							33.9	29	
100200060302	Basin-Boulder	26628	41.61	Aerial	265.5	132.75	4.6	28.7		Southwest
100200060302	Basin-Boulder	26628	41.61	Ground	297.6	148.81	5.2	32.2		Southwest
	Basin-Boulder Total							60.9	29	
100200060301	RedRock	19338	30.22	Aerial	443.5	221.75	7.8	48.0		Southwest
100200060301	RedRock	19338	30.22	Ground	197.2	98.62	3.5	21.3		Southwest
	RedRock Total							69.3	29.0	
100200060105	SFRedRock	14569	22.76	Ground	331.6	165.82	5.8	35.9		Southwest
	SFRedRock Total							35.9	29	
100200060104	LowlandLow*	16799	26.25	Ground	340.6	170.29	6.0	36.8		Southwest
	LowlandLow Total							36.8	29	
100200060102	Powderhorn	12093	18.90	Ground	337.8	168.90	5.9	36.5		Southwest
	Powderhorn Total							36.5	29	

HUC 6 CODE	NAME	Total HUC Acres	square miles	TREATMENT	Acres Treated	Total App in lbs of Tordon	lbs Tordon Deliver to stream	CFS REQUIRED @ 6% OVERLAND DEL. @ .5 LBS/ACRE	2 YR STORM EVENT DIS-CHARGE (CFS)	USGS FLOW EVENT MODEL ZONE
100200050106	Beall	39767	62.14	Aerial	2879.2	1439.60	50.4	311.4		Southwest
100200050106	Beall	39767	62.14	Ground	10.7	5.33	0.2	1.2		Southwest
	Beall Total							312.6	29	
100200041105	WillowGulch*	10925	17.07	Ground	878.9	439.47	15.4	95.1		Southwest
	WillowGulch Total							95.1	29	
100200040601	Tie	20067	31.35	Ground	333.1	166.56	5.8	36.0		Southwest
	Tie Total							36.0	29	
100200040407	TrailLow	18603	29.07	Aerial	100.5	50.25	1.8	10.9		Southwest
100200040407	TrailLow	18603	29.07	Ground	331.1	165.53	5.8	35.8		Southwest
	TrailLow Total							46.7	29	
100200040406	Moosehorn*	15503	24.22	Aerial	140.2	70.10	2.5	15.2		Southwest
100200040406	Moosehorn*	15503	24.22	Ground	183.6	91.82	3.2	19.9		Southwest
	Moosehorn Total							35.1	29	
100200071403	NMeadow	25114	39.2	Ground	295.69	147.85	5.2	32.0		
	NMeadow Total							32.0		
100200030109	RubyMid*	33407	52.20	Aerial	336.2	168.10	5.9	36.4		Southwest
100200030109	RubyMid*	33407	52.20	Ground	114.8	57.42	2.0	12.4		Southwest
	Ruby Mid Total							48.8	29	
170102021204	Stony	21678	33.87	Aerial	1016.1	508.05	17.8	109.9		West
170102021204	Stony	21678	33.87	Ground	35.4	17.71	0.6	3.8		West
	Stony Total							113.7	43	
170102021203	CornishGulch	11139	17.40	Aerial	330.9	165.45	5.8	35.8		West
170102021203	CornishGulch	11139	17.40	Ground	168.3	84.14	2.9	18.2		West
	Cornish Gulch Total							50	43	
170102021202	SluiceGulch*	16102	25.16	Aerial	426.8	213.40	7.5	42.6		West
170102021202	SluiceGulch*	16102	25.16	Ground	25.4	12.70	0.4	2.7		West

HUC 6 CODE	NAME	Total HUC Acres	square miles	TREATMENT	Acres Treated	Total App in lbs of Tordon	lbs Tordon Deliver to stream	CFS REQUIRED @ 6% OVERLAND DEL. @ .5 LBS/ACRE	2 YR STORM EVENT DIS-CHARGE (CFS)	USGS FLOW EVENT MODEL ZONE
	Sluice Gulch Total							48.9	43	
170102020502	Gird*	20772	32.46	Aerial	462.0	231.00	8.1	50		West
170102020502	Gird*	20772	32.46	Ground	399.6	199.81	7.0	43.2		West
	Gird Total							93.2	43	
170102020304	BoulderLow*	12270	19.17	Aerial	101.2	50.60	1.8	10.9		West
170102020304	BoulderLow*	12270	19.17	Ground	717.6	358.79	12.6	77.6		West
	BoulderLow Total							88.5	43	
170102020303	SBoulder	13355	20.87	Aerial	287.0	143.50	5.0	31.0		West
170102020303	SBoulder	13355	20.87	Ground	738.2	369.12	12.9	79.8		West
	Sboulder Total							110.8	43	
170102020204	RockMid*	13262	20.72	Aerial	573.2	286.60	10.0	62.0		West
170102020204	RockMid*	13262	20.72	Ground	163.1	81.55	2.9	17.6		West
	Rock Mid Total							79.6	43	
170102020104	Flint	8446	13.20	Aerial	424.4	212.20	7.4	45.9		West
170102020104	Flint	8446	13.20	Ground	133.4	66.70	2.3	14.4		West
	Flint Total							60.3	43	
170102020609	0	25555	39.93	Aerial	1002.5	501.25	17.5	1083.4		West
170102020609	0	25555	39.93	Ground	339.6	169.79	5.9	36.7		West
	UnNamed Total							145.1	43	
170102020501	Henderson	19288	30.14	Aerial	1155.5	577.75	20.2	125.0		West
170102020501	Henderson	19288	30.14	Ground	618.1	309.07	10.8	66.8		West
	Henderson Total							191.8	43	
170102020403	0	19145	29.91	Aerial	322.9	161.45	4.7	34.9		West
170102020403	0	19145	29.91	Ground	122.8	61.41	2.1	13.3		West
	UnNamed Total							48.2	43	

APPENDIX C

MODELED DATA FOR 6TH CODE HUCs, WHERE ADDED MITIGATIONS ARE APPLIED TO MEET 0.12 PPM FOR PICLORAM AND PROVIDE ADEQUATE PROTECTION TO BULL TROUT

COMPARISON OF 2 YEAR STORM EVENT DISCHARGES

HUC6CODE	NAME	Total HUC Acres	square miles	TREATMENT	Acres Treated	Total App in lbs of Tordon	lbs Tordon Deliv to stream	USGS FLOW EVENT MODEL ZONE	CFS REQUIRED @6% OVRLND DEL. AND .5 LBS/ACRE	2 YEAR STORM EVENT DISCHARGE (CFS) OVER 3840 ACRES
170102021204	Stony	21678	33.87	Aerial	1016.1	508.05	17.8	West	109.9	
170102021204	Stony	21678	33.87	Ground	35.4	17.71	0.6	West	3.8	
	Stony Total								113.7	43
170102020502	Gird*	20772	32.46	Aerial	462.0	231.00	8.1	West	50.0	
170102020502	Gird*	20772	32.46	Ground	399.6	199.81	7.0	West	43.2	
	Gird Total								93.2	43
170102020304	Boulder Low*	12270	19.17	Aerial	101.2	50.60	1.8	West	10.9	
170102020304	Boulder Low*	12270	19.17	Ground	717.6	358.79	12.6	West	77.6	
	Boulder Low Total								88.5	43
170102020303	S. Boulder	13355	20.87	Aerial	287.0	143.50	5.0	West	31.0	
170102020303	S. Boulder	13355	20.87	Ground	738.2	369.12	12.9	West	79.8	
	S. Boulder Total								110.8	43
170102020204	RockMid*	13262	20.72	Aerial	573.2	286.60	10.0	West	62.0	
170102020204	Rock Mid*	13262	20.72	Ground	163.1	81.55	2.9	West	17.6	
	Rock Mid Total								89.6	43
170102020104	Flint	8446	13.20	Aerial	424.4	212.20	7.4	West	45.9	
170102020104	Flint	8446	13.20	Ground	133.4	66.70	2.3	West	14.4	
	Flint Total								60.3	43
170102010404	LostCreek	31111	48.61	Aerial	1469.4	734.70	25.7	Southwest	158.9	
170102010404	LostCreek	31111	48.61	Ground	53.6	26.78	0.9	Southwest	5.8	
	LostCreek Total								164.7	29
170102010305	West Valley	30536	47.71	Aerial	465.9	232.95	8.2	Southwest	50.4	
170102010305	West Valley	30536	47.71	Ground	365.9	182.93	6.4	Southwest	39.6	
	West Valley Total								90.0	29

File Code:	2670	**Date:**	April 22, 2002
Route To:	1950		

Subject: Biological Evaluation – Noxious Weed Control EIS

To: Forest Supervisor and ID Team Leader – Leaf Magnuson

INTRODUCTION

The Regional Forester of the Northern Region has identified plant, bird, and animal species for which viability is a concern as Sensitive. Sensitive Species are those recognized on the Update of Northern Region Sensitive Species List dated March 12, 1999 (amended November 2000).

After considering habitats (important for aquatic organisms), which could be affected, evaluating data from inventories and conducting literature review, it was determined the following sensitive species may occur in those habitats affected by noxious weed control methods. The following four species are discussed in detail:

FISH:	Westslope Cutthroat Trout (*Oncorhynchus clarki lewisi)*, Fluvial Arctic Grayling (*Thymalus arcticus*)
AMPHIBIANS:	WesternToad (*Bufo boreas)*, Northern Leopard Frog (*Rana pipiens)*

PROPOSED PROJECT

The Beaverhead-Deerlodge National Forest proposes to use all appropriate methods of noxious weed (Table 1) control, including use of chemical herbicides and biological controls, enforcing practices which help prevent weed introduction and spread, inventory and monitoring to detect infestations, and mechanical weed pulling. Noxious weeds do not follow ownership boundaries therefore Integrated Weed Management prescribes coordination between public and private land managers. Because the managmeent action proposed will significantly increase the numbers of acres treated by ground and aerial application of herbicides, this analysis will largely focus on risk of effects associated with the chemicals.

Table 1. Montana State Noxious Weeds targeted on the Beaverhead-Deerlodge National Forest.

Common Name	Scientific Name
Category 1*	*noxious weeds currently established and generally widespread in many counties of the State
Leafy spurge	*Euphorbia esula*
Canada thistle	*Cirsium arvense*
Russian knapweed	*Centaurea repens*
Spotted knapweed	*Centaurea maculosa*

Diffuse knapweed	*Centaurea difussa*
Field bindweed	*Convolulus arvensis*
Whitetop (hoary cress)	*Cardaria draba*
Dalmation toadflax	*Linaria dalmatica*
St. Johnswort (goatweed)	*Hypercum perforatum*
Sulfur cinquefoil	*Potentilla recta*
Common tansy	*Tanacetum vulgare*
Ox-eye daisy	*Chrysanthemum leucanthemum*
Houndstongue	*Cynogbssum officinale*
Category 2*	*noxious weeds recently introduced or rapidly spreading from current infestation sites
Dyer's woad	*Isatis tinctoria*
Purple loosestrife (Lythrum)	*Lythnum salicaria, L. virgatum* and crosses
Tansy ragwort	*Senecio jacobia*
Meadow hawkweed complex	*Hieracium pratense, H. floribundum, H. piloselloides*
Orange hawkweed	*Hieacium aurantiacum*
Tall buttercup	*Rannunculus acris*
Tamarisk	*Tamarix* spp
Category 3*	*noxious weeds not detected or found only in small, scattered, Localized infestations
Yellow starthistle	*Centaurea solstitalis*
Common crupina	*Crupina vulgaris*
Rush skeletonweed	*Chondeilla juncea*
County Control*	*noxious weeds established for control by county weed boards
Yellow toadflax	*Linaria vulgaris*
Musk thistle	*Cardurus nutans*
Field scabious	*Knautia arvensis*
Black henbane	*Hyocyamus niger*

Burdock	*Actium minus*
Common mullein	*Verbascum thapsus*
Bull thistle	*Cirsium vulgare*

The EPA has determined risk associated with aerial application of registered chemical herbicides. EPA registered herbicides all have application guidelines on the labels. The website: http://infoventures.com/e-hlth/ has an Environmental Health Reference and Resource Materials section where you can find this information.

Improper aerial application is not anticipated. All herbicide applicators whether Forest Service or contractor employees, are required to follow label directions. Field inspectors will be on-site during all aerial applications to monitor compliance with label specifications mitigation measures defined in the EIS.

The Risk Assessment for Herbicide Use in Forest Service Regions 1, 2, 3, 4, and 10 and on Bonneville Power Administration Sites (1992) is available in the project file at the B-DNF Supervisor's Office in Dillon. There is also a website address for that publication at: http://www.fs.fed.us/foresthealth/pesticide/health.htm

Direct Control: Direct methods will be applied annually on 15 –16,000 (37%) of the 43,012 weed-infested acres on the Beaverhead-Deerlodge National Forest. Approximately nine thousand acres of chemical treatment will occur by air and 7,000 acres will be treated with herbicide from the ground. Mechanical, biological and cultural treatments will be applied when practical and are included in the annual acres identified for treatment.

The proposal considers all EPA registered chemicals approved for weed control, including herbicides developed and approved for use in the future. Registered herbicides are shown in Table 2.

Table 2. EPA registered chemicals being considered for weed control on the Beaverhead-Deerlodge National Forest

Common Name	Trade Name
2,4-D	Hi Dep, Weedar 64, Weed RHAP
Chlorsulfuron	Telar
Clopyralid	Stinger, Reclaim, Transline
Dicamba	Banvel, Banex, Trooper
Glyphosphate	Roundup, Rodeo, Accord
Haxxzinone	Velpar, Velpar ULW, Velpar L, Pronone 10G
Imazapyr	Arsenal, Chopper, Contain
Metsulfuron methyl	Escort, Ally
Picloram	Tordon, Grazon, Access, Pathway
Pyridinecarboxylic acid	Pleateau
Sulfometuron methyl	Oust
Triclopyr	Garlon, Grazon
Adjuvants	
Surfactants	
Dye	

Biological controls that may be used are: Knapweed gallflies (*Urophora affinis* and *U. quadrifasciata*), Knapweed gallfly (*Latin binomial*,), and Leafy spurge moth (*Apthona nigris-cutis*.) All biological agents willbe released according to APHIS requirements, or Forest Service policy, whichever is more restrictive. New agents may be substituted if current agents are not available or have been found ecologically harmful.

Indirect Control: Indirect control methods include preventing spread of; and new introductions of noxious weeds, along with public education. Survey, and monitoring activities will be accomplished on about half of the infested acres every year. Prevention measures include OHV travel restrictions, vehicle cleaning, and other related practices. Education programs, publications, postings, news releases, and cooperation with other agencies will continue until monitoring indicates a need for change. The acres and type of control measures implemented on National Forest System lands in this proposal are displayed in Table 3.

Selection methods for aerial application sites:

When a site is listed for potential aerial application it falls into one of the following categories:

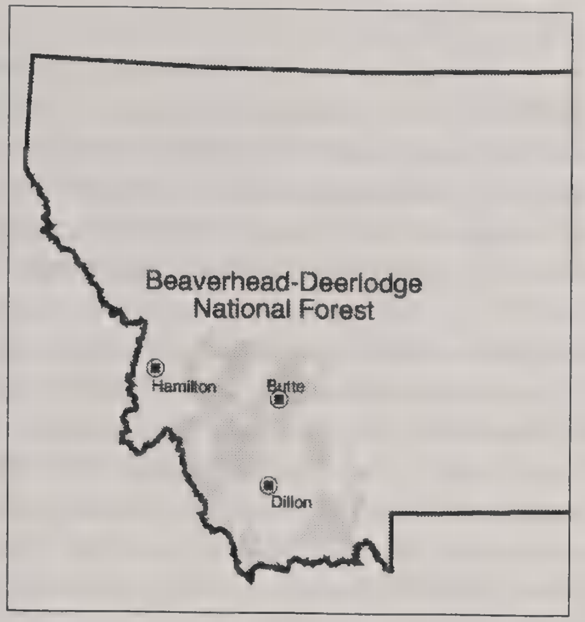
1. Weed infestations do not exist under moderate to heavy forest canopy.
2. The infestation covers a large area and significant efficiency would be lost treating it from the ground. There is no acre limit for this decision, but these sites are generally over 20 acres with fairly dense weed coverage.
3. The infestation is located on rough, steep terrain preventing effective ground application and/or may be dangerous for employees to treat on foot.
4. The infestation is remote requiring an inordinate amount of time for crews to arrive and apply ground treatment.
5. The weed infestation logically fits into a coordinated weed control program with adjacent landowners. The combined area to be treated on and off Forest is most efficiently treated by air if treated at the same time.

Table (3). Summary of the features of the Noxious Weed Project, Beaverhead-Deerlodge National Forest. February 27, 2002.

Features	Quantity
Biological Control	125 acres
Mechanical Control	35 acres
Ground Herbicide Application	6,831 acres
Aerial Herbicide Application	9,0288 acres
Total Annual Treatment	16,019 acres

Project Area

The proposal includes lands on the Beaverhead-Deerlodge National Forest. This is approximately 3.3 million acres of National Forest lands in Beaverhead, Deer Lodge, Granite, Jefferson, Madison, Powell, and Silver Bow Counties in Southwestern Montana.


Beaverhead-Deerlodge
National Forest
Hamilton
Butte
Dillon

SENSITIVE SPECIES;

Westslope cutthroat trout

Westslope cutthroat trout, (WCT) *Oncorhynchus clarki lewisi* inhabit streams on both sides of the continental divide. Its eastside distribution is largely in Montana, but includes some headwaters in Wyoming and southern Alberta (Behnke 1992). It occurs in the Missouri basin downstream to about 60 km below Great Falls and in headwaters of the Judith, Milk, and Marias rivers. On the west side the subspecies occurs in the upper Kootenai River, the Clark Fork River, the Spokane River above Spokane Falls, the Coeur d'Alene and the St. Joe Drainages, and the Clearwater and Salmon Rivers.

Westslope cutthroat's distribution and abundance are in decline (Behnke 1992; Bjornn and Liknes 1986; Liknes and Graham 1988) East of the continental divide, less than 5% of its historic range is occupied within the upper Missouri River drainage in Montana. Extinction risk for 144 known populations, on federally managed lands, was assessed using a 'customized' Bayesian viability assessment procedure (Shepard et al 1997). Probability of persistence was estimated based on subjective evaluation of population survival and reproductive rates as influenced by environmental conditions (Lee and Rieman 1997). Results indicated 90% of the populations were at a high, to very high risk of extinction over the next 100 years. These findings prompted completion of a statewide conservation strategy, which was completed in 1999.

Habitat abundance and quality is a significant concern for WCT because of increased risk of local and general extinction. Major factors in the decline of WCT include competition and hybridization with non-native salmonids, overfishing, and habitat loss, fragmentation and degradation (Reiman and Apperson 1989; Liknes 1984; Liknes and Graham 1988).

Westslope cutthroat was petitioned for listing throughout its historic range in 1997. In 2000, the USFWS found WCT to be "Not Warranted for Listing". A recent lawsuit, resulted in the USFWS' determination being remanded to the USFWS for reevaluation. They are to issue a new finding in 2003.

Fluvial Arctic Grayling

Fluvial (permanently stream-dwelling) arctic grayling became a major concern in Montana in the late 1970's and early 1980's. Concerns escalated for over a decade until a conservation plan was adopted in _____. While numerous lake-dwelling populations are present here and throughout the northern Rocky Mountains, the only confirmed self-sustaining fluvial population remaining outside of Canada and Alaska occurs in the Big Hole River. Historically, they were distributed throughout the upper Missouri River basin, with populations in the Big Hole, Red Rock, Beaverhead, Jefferson, Madison, Gallatin, Smith, and Sun Rivers providing most of the habitat (Kaya 1990). The species appeared to have been irregularly distributed, with the Sun and Smith Rivers providing the only habitat downstream from Three Forks (Vincent 1962).

Montana grayling exhibit all the stages of life history typified by inland trout populations, including migrations between wintering and spawning areas. Spawning occurs over a period of nearly 3 months from late April through June. They may be able to use a wide range of substrates for spawning because they do not excavate a redd and also may not need a highly porous substrate to facilitate water flow to deeply buried eggs.

Available information suggests they require clean, cool water but may be able to tolerate lower levels of dissolved oxygen than other stream salmonids (Kaya 1990). For winter habitat, large deep pools with depth greater than 1.2 meters, or spring fed reaches of

small streams that do not freeze solid, are especially important. Reaches with low water velocity appear important for young fry from swimup to several weeks of age.

Efforts over the last 5 years, guided by the Conservation Plan, have resulted in grayling reintroductions into the North and South Forks of the Sun Rivers as well as the Ruby and Beaverhead Rivers. A portion of the reintroduction area in the Ruby River is on Beaverhead- Deerlodge National Forest Lands. Limited reproduction has been documented in the Ruby and the population continues to be monitored.

Western Toad

The Western Toad (*Bufo boreas)*, is currently recognized as two subspecies ranging from the Rocky Mountains to the Pacific Coast and From Baja Mexico to southeast Alaska and the Yukon Territory (Stebbins 1985 as reported in Maxell 2000). They are found in a variety of habitats, including wetlands, forests, sagebrush meadows and floodplains.

Adult and Juvenile toads are freeze intolerant and overwinter and shelter in underground caverns, or rodent burrows (Maxell 2000). Adults feed on a variety of ground dwelling invertebrates and are known to eat smaller individuals of their own species. Breeding typically occurs from May to July in shallow areas of large and small lakes, ponds, slow moving streams and backwater channels of rivers (Black 1970a and Metter 1961; as reported in Maxell 2000). Tadpoles metamorphose in mass in 40 to 70 days and can be found in dense aggregations adjacent to breeding grounds.

Within the last 25 years, populations of western toads have undergone population crashes in Colorado, Utah, southeast Wyoming and New Mexico (Stuart and Painter 1994; Ross et al. 1995; Corn et al. 1997; Loeffler 1998). It is listed as endangered by the state of Colorado and considered a candidate species which is "warranted , but precluded, for federal listing by the USFWS in the southern Rocky Mountains (Colorado, southeast Wyoming and northern New Mexico) (Ross et al. 1995; Loeffler 1998).

In the northern Rocky Mountains western toads have also undergone declines. Surveys in the late 1990's revealed they were absent from a number of areas they historically occupied. While they remain widespread across the landscape, they appear to be occupying only 5 –10%, or less, of the suitable habitat (Maxell 2000). Based on these findings the USFS listed the western toad as sensitive in all of Region 1's National Forests, and initiated an regional inventory in Montana. As a result, a systematic inventory of standing water bodies in 40 randomly chosen 6th level hydrologic unit code (HUC) water sheds was completed, across western Montana, during the summer of 2000. Results indicated they were widespread, but extremely rare.

Northern Leopard Frog

The northern leopard frog historically ranged from Newfoundland and northern Alberta in the north to the Great Lakes region, the desert Southwest and the Great Basin in the south (Maxell 2000). A number of isolated populations historically existed in the pacific northwest and California (Stebbins 1985). In Montana they have been documented across the eastern plains and in many of the mountain valleys on both sides of the Continental Divide at elevations up to 6000 feet. Over the last few decades the leopard frog has undergone declines across much of the western portion of their range (Stebbins and Cohen 1995 as reported in Maxell 2000). Most northern leopard frogs in western Montana became extinct in the 1970's or early 1980's. The only 2 population centers known to exist in western Montana are near Kalispell and Eureka (Maxell 2000). The northern leopard frog is a sensitive species in all the Region 1 Forests.

The northern leopard frog is found in and adjacent to permanent slow moving or standing water bodies with considerable vegetation, but may range widely into moist meadows, grassy woodlands and even agricultural areas (Nussbaum et al. 1983). Adults feed on invertebrates, but may cannibalize smaller individuals. Adults overwinter on the bottom surface of permanent water bodies, under rubble in streams or in underground crevices that don't freeze. Breeding occurs in March and April. Juveniles may move as much as 8 kilometers from their natal ponds to their adult seasonal territories (Dole 1971; Seburn et al. 1997).

Land management activities noted as having possible impacts on western toads and northern leopard frogs include timber harvest, grazing, fire and fire management activities, non-native species, road and trail development and use, water impoundment, development and use recreational facilties, harvest, noxious weeds and weed management, and habitat fragmentation.

Impacts of weed infestations on amphibians have not been adequately evaluated. Maxell (2000) indicated, however, that non-native aquatic and terrestrial weeds can form dense stands that may exclude native amphibians, thus reducing available habitat. Weed management with chemical herbicides have the potential to impact amphibian communities. Many amphibians have vascularization in the epidermis of the skin, which allows easy absorption of toxicants (Maxell 2000). Effects of chemical contamination ranged from direct mortality to subletheal effects, such as reductions in disease resistance, changes in growth, decreased reproductive ability and morphological abnormalities (Cooke 1981; Hall and Henry 1992; Boyer and Grue 1995; Carey and Bryant 1995).

Direct, Indirect, and Cumulative Effects

Direct and Indirect Effects

Risk of impacting sensitive fish and aquatic life stages of amphibians is directly related to possible herbicide contamination of streams and lakes, and the necessity for water quality conditions to allow individuals throughout all life stages of development and maturation to remain healthy. Risk is indirectly related to effects on aquatic insects, used for food, and riparian and upslope vegetation, necessary to maintain many physical elements of desired habitat characteristics. Effects to sensitive species may occur as a function of mechanical, chemical, or biological treatments of weeds. Further discussion on each element is included below.

Effects to fish and sensitive amphibians from mechanical removal of weeds are considered discountable due to minimal ground disturbance and the limited extent it will occur. Biological control of weeds may have slight beneficial effects, albeit they are likely unmeasurable. There are no negative impacts associated with biological control.

Potential negative effects to westslope cutthroat, grayling and sensitive amphibians from herbicide applications, as proposed on the Beaverhead-Deerlodge Forest, is a function of several factors: 1) toxicity of those herbicides used; 2) concentrations of herbicide that contact the organism (may have direct relationship with application rate and methods); 3) duration of exposure; 4) impacts to food supply (i.e. aquatic insects); 5) Changes in riparian and upslope vegetation. Some potential for positive effects on reductions in weed densities and potential reduced erosion as native or desired non-native vegetation

becomes reestablished. The benefit associated with replacing weeds is considered small enough to be discountable in most cases.

Toxicity of Herbicides

Mayer and Ellersieck (1986) reviewed 4,901 acute toxicity tests of over 400 herbicides stored in the database of the US Fish and Wildlife Service, to determine if there were any statistically valid trends that could be used to compare the 66 species studied. They found there is no single species, family or class that, in all cases, is most sensitive to chemicals. They agreed with the conclusions of others, that species best represent themselves and not others, but also observed it was somewhat common that insects were more sensitive to most herbicides than crustaceans, followed by fish, then amphibians (the least sensitive class). This said, it should be noted, however, insects and amphibians have been inconsistently studied making it hard to determine any pattern of statistical significance.

A number of herbicides proposed for use on the Beaverhead-Deerlodge show some potential for being toxic to salmonids and sensitive amphibians. Toxicity studies have been conducted on cutthroat trout, however, grayling and our sensitive amphibian species have not been specifically studied. A general comparison of lethal toxicity levels (LC50) for salmonids and other aquatic species exposed to certain herbicides is provided in Table 4 below.

Table 4. Toxicity data for aquatic species exposed to the herbicides picloram, clopyralid, glyphosate, 2-4,D and dicamba during acute and chronic toxicity tests.

Herbicide/ Species	Exposure	LC50 mg/L	NOEL mg/L
Picloram			
Cutthroat Trout	96 hr	1.5-8.6	
Cutthroat Trout			2.9
Cutthroat Fry	22 days		0.29
Lake Trout	96 hr	1.6-4.3	
Rainbow Trout	96 hr	4-58	
Daphnia spp.	48 hr	76	
Pteronarcys spp.	96 hr	48	
Clopyralid			
Rainbow Trout	96 hr	2000	
Daphnia	48 hr	1100	
Fathead Minnow	96 hr	2900	
Bluegill	96hr	4700	
Glyphosate			
Rainbow Trout	96 hr	8-220	
Chinook salmon	96 hr	19-220	
Bluegill	96 hr	24-120	
Chum salmon	96 hr	10-202	
Coho salmon	96 hr	27-210	

Herbicide/ Species	Exposure	LC50 mg/L	NOEL mg/L
Coho slmon fry	96 hr	13	
Daphnia	48 hr	85-780	
Fathead minnow	96 hr	97	26
2,4-D			
Rainbow Trout	96 hr	15-420	
Chinook salmon	96 hr	>100	
Chorus frog	48 hr		50
Chorus frog	24 hr	100	
Fathead minnow	96 hr	335-800	
midge spp.	96 hr	100-405	
Pteronarcys spp.	96 hr	15	
Bluegill	96 hr	100-335	
Bluegill	8 days		5
Dicamba			
Rainbow Trout	96 hr	28	
Bluegill	96 hr	>50 – 135	
Daphnia	96 hr	> 96	
Gammarus spp.	96 hr	>100	

From the table above, a couple of observations can be made: 1) Trout seem to show a greater propensity for being affected than other fish; and 2) Picloram seems to be relatively more toxic to all aquatic species tested than any of the other herbicides – with the possible exception of the stonefly Pteronarcys when exposed to 2,4-D. With this in mind picloram is used as a surrogate for all herbicides to assess risks to sensitive species in this biological evaluation. The acute toxicity of picloram varies depending on the formulation used and the species involved. Some salmonids have been found to have substantial tolerance to Tordon 22K (brook and brown trout with 96 hr LC-50s of 91 and 52 ppm, respectively). Cutthroat and lake trout exhibited much greater sensitivity in laboratory tests (96 hr LC50s of 1.5 - 8.6 mg/L). Tolerance can be affected by a number of things such as water chemistry (water hardness, temperature, pH) duration of exposure to the chemical and the developmental stage (i.e. egg, fry, fingerling or adult). Chronic effects to some salmonids become evident at much lower concentrations than the LC-50 values shown above, but the exposure period is much longer.

Establishment of a "safe" concentration level

For this biological evaluation, selection of a "safe" concentration level (to assess potential effects of picloram on sensitive species) follows recommendations presented in the Level 1 Team Briefing on Forest Herbicide Application, (March 21, 1999). The "safe" concentration level chosen is synonymous with a "maximum allowable toxicant concentration" or MATC equaling 0.12 ppm. This value was derived by taking 1/25 of 3.0 ppm (the 96 hour LC-50 for rainbow trout).

Determining levels of Picloram that may reach surface waters

Rational used to determine levels of picloram that could reach surface water parallels recommendations used in the Level 1 Team Briefing on Forest Herbicide Application, (March 21, 1999). The amount of herbicide reaching surface water depends on the ratio of runoff dominant and infiltration dominant conditions and the total amount of herbicide applied within a drainage. It was assumed 6% of the herbicide applied to runoff dominant sites could reach surface water should an intense storm occur shortly after application. On infiltration dominant sites, 1% of the herbicide applied was deemed possible to enter surface water through subterranean flow.

Ratio of run-off versus infiltration dominant sites

Variability in site-specific conditions across the Forest are extremely difficult to accurately assess within a broad-scale analysis. To simplify, a very conservative, standardized approach was used - assuming 50% of all areas treated would be runoff dominant and 50% would be infiltration dominant. This should be – in nearly all cases – an overestimate of runoff type situations.

Application rates for picloram

Although picloram is most often applied in Forest Service programs as the sole herbicide, it is also applied in combination with 2,4-D and less commonly with other herbicides. The most common methods of ground application for Tordon (active ingredient = picloram) involve backpack (selective foliar) and boom spray (broadcast foliar) operations. Labeled application rates for picloram range from 0.13 to 1.5 lb a.e./acre. However, the Forest Service typically uses rates in the lower part of this range -i.e.,0.3 to 0.56 lb a.e./acre. (Ecological Risk Assessment – USDA FS, 2001).

For this analysis, application rates of 0.5 lb Picloram/acre was used to model potential delivery of active ingredient to water bodies. Based on summary data from the Forest described above, these represent rates occurring on only 5% of the acres treated. High-end values for picloram (which has the greatest potential, of the herbicides we use, to impact aquatic organisms) were intentionally chosen to evaluate threats to sensitive species. If this rate seems to pose little risk, then treatments should be able to be broadly implemented without necessitating various mitigations designed for individual sites.

Duration of Exposure

The difficulty in assessing risk to fish and aquatic life stages of amphibians is that testing procedures used in the lab do not match up with what happens in the field. A typical field situation would be where fish may be exposed once or twice over the summer to concentrations of herbicide that may be above that considered to be safe, but only for a few hours. The lab situation also excludes the potential for individuals to reduce exposure by moving. The risk of contamination is generally associated with the first storm following application, which generates overland flow. Herbicide concentrations in streams generally peak in a 4 to 6 hour period, following the runoff-generating event. Thus, in this analysis, stream flows generated from storm events (with the potential to dilute herbicides delivered to the stream) are considered to occur over a 6 hour period.

Model used for Risk Assessment:

Step 1: Determine P, the total amount of herbicide to be applied in a watershed.

P (lbs) = R (lbs/ac) x A (ac) where R is the application rate of active ingredient and A is the total acreage treated.

For picloram, we used a standardized rate of 0.5 lbs active ingredient/acre (see discussion above).

Step 2: Determine percent of treated area that will produce overland flow or allow infiltration.

It was assumed 50% of all areas treated would be runoff dominant and 50% would be infiltration dominant. See discussion above.

Step 3: Determine Y, the maximum yield in pounds of herbicide that could potentially reach surface waters.

For the purposes of this analysis, 6% for runoff dominant (50% of the acres treated) and 1% for infiltration dominant (50% of the acres treated) were used.

Y (lbs) = (P/2) x D1 + (P/2) X D2 Where D1 is the delivery ratio for overland flow dominant sites (0.06) and D2 is the delivery ratio for infiltration dominant sites (0.01).

Step 4: Define the concentration level necessary to prevent impacts to sensitive species . For the purposes of this analysis 0.12 parts per million were used.

Step 5: Determine the minimum amount of water F (ultimately expressed in lbs) necessary to dilute the herbicide delivered to the stream to meet a targeted "safe" concentration of .12 ppm (1.2 X 10 –7).

Y (lbs) / 0.00000012 = F (cfs) x 62.43 lbs/cfs x T (sec) where F, the flow rate of the stream is expressed in cubic feet per second, and T denotes the estimated time in seconds which overland and infiltration derived flows would be yielding herbicide. A cubic foot of water weighs 62.43 pounds. The minimum delivery time for over land flow dominated systems is assumed to be six hours (21,600 sec).

Step 6

Determine discharges for storm related events using equations from Water Resources Investigation Report 92-4048 (US Geological Survey 1992). The Flint and Rock Creek drainages fall within the West Region when calculating flood-frequency discharges based on drainage –basin characteristics. All remaining areas on the Forest fall within the Southwest Region. Different regression equations are used for each region. All equations use drainage area as a common factor influencing discharge.

The following standardizations and assumptions were made:

1) In the Flint and Rock Creek drainages, P (the average annual precipitation) in ranged from 27 – 35 inches/year based on 3 gauge sites. A single value of 34 inches/year was used in the model to calculate storm discharges.
2) In the Southwest Region HE (percent of area within the drainage above 6000 feet elevation). The Forest Boundary on the B-D in the SW region is almost always above 6000 feet. This value was standardized at 100% for the purposes of this model.

Step 7

Compare stream flows needed to provide adequate dilution F with storm event discharges calculated for individual 6th code HUCs.

Two year, 5 year, 10 year, 25 year, 50 year and 100 year storm event discharges were calculated for each HUC where herbicide treatment is proposed. In all cases, discharges for the smallest calculated storm events (2 year), when calculated for the entire acreage of the HUC, exceeded the amount of water necessary to meet the targeted "safe" concentration levels of picloram. See spreadsheets attached in Appendix A.

It seems unreasonable, however, to presume that a storm would always be extensive enough or perfectly positioned to encompass the entire drainage. The potential for isolated storm cells to develop, which produce intense rain showers within a small area, is always present. Considering this possibility, effectively reduces the drainage area that should be used to calculate storm event discharges from the total acreage within a HUC, to the area directly covered by a potential storm. Thus, additional standardizations and assumptions were made:

1) If we are evaluating risk based on isolated storm cells, it is unlikely that large (25 – 100 year) storm events would occur. For the purposes of this model, The equation to calculate a 2-year storm events (approximating bank full flows) was used as a standard.
2) The area that might potentially be covered by a small, isolated storm cell was considered and standardized at 3,840 acres (6 square miles).
3) For the purposes of this model, Two-year storm related discharges were calculated for all HUCs, based on a drainage area of 6 square miles.

Model Results

Analysis results indicate treatments proposed for weeds within 37, 6th code HUCs across the Forest, show some risk for exceeding "safe" concentrations in surface waters. Within 21 of these HUCs, modeled concentration levels exceed the safe concentration by 35% or less. In actuality, instream concentrations should remain below 0.12 ppm for these 21 HUCs, and impacts to TES or other aquatic species should not occur. This is because mitigation measures defined in the EIS provide significant protection and all standardized values used in the model, were extremely conservative. In one example of this, the model presumes a storm event will occur immediately after application, which produces significant overland flow. In reality, the likelihood that an isolated, intense storm would happen right after extensive herbicide application and center itself on the treated area is very low. Observation of a weather forecast is required prior to aerial application. Using weather forecasts to guide herbicide application, should effectively reduce the concentrations delivered to streams by another 10 to 50%, provided forecasts are relatively accurate out to at least 2 or 3 days. Based on results from Watson, Rice and Monnig (1989) photo-decay of Picloram ranged from 22 to 44% within 7 days. The following rational further supports the likelihood that impacts to aquatic species within those HUCs will be avoided.

1) Most range and forest lands represent infiltration dominant sites rather than overland runoff sites.
2) Stream flows increase as they travel down drainage; decreasing concentrations and further detoxifying chemicals.
3) Exposure to herbicides in the field would typically be only a fraction of the time organisms are exposed during 96-hour acute toxicity LC-50 tests in the lab.
4) The "no effects threshold" chosen for this analysis is the most conservative recommended.
5) Aerial treatment will not occur within 300 feet of a stream, lake or water body, which supports westslope cutthroat, or other species of special consideration.
6) The ecological risk assessment for picloram made a relatively broad assumption that runoff into surface water is unlikely in relatively arid areas -i.e., annual rainfall of

less than 10 inches. This statement was qualified to some extent by saying "some runoff could occur during unusually severe rainfalls, at least at sites with high runoff potential".

7) The analysis is extremely conservative and does not account for the capability of aquatic organisms to move out of slightly contaminated water.

Within 16 HUCs, the model suggests some risk exists that concentrations could exceed "safe" levels. To prevent this from occurring, mitigations specific to these HUCs listed in Table 4 were added, limiting the total amount of picloram that can be applied during individual treatments.

Table 4. List of sixteen 6th code HUCs where the model predicted picloram concentrations might exceed 0.12 parts per million, should a 2 year storm event create runoff from the treated area. Data includes the total acres within each HUC, acres proposed for treatment, estimated total lbs of picloram that would be applied without any restrictions, estimated lbs of picloram that could be delivered to the stream, stream discharge in CFS required to dilute picloram (delivered to stream) sufficiently to meet 0.12 ppm, estimated 2 year storm event discharges for an area covering 3840 acres (6 miles square), and the Maximum amount of picloram that could be applied while ensuring 0.12 ppm would be met, based on the model.

6th HUC	Name	Total Acres	Acres Treated	Lbs Picloram Applied @ .5 lbs/acre	Estimated Lbs Picloram Delivered to stream	CFS required @ 6% overland delivery	2 year storm event discharge (cfs) for 3840 acres	Max. amt of Picloram allowed for application to meet MATC
170102021204	Stony	21678	1051.5	525.76	16.9	105	43	335
170102020502	Gird	20772	862.6	430.81	13.8	85.2	43	335
170102020304	Boulder Low	12270	818.8	409.49	13.1	81	43	335
170102020303	South Boulder	13355	1025.2	513.62	16.4	101.4	43	335
170102020204	Middle Fork Rock	13262	736.3	368.15	11.8	72.8	43	335
170102020609	Unnamed	25555	1342.1	671.04	21.4	132.7	43	335
170102020501	Henderson	19288	1773.6	886.83	28.4	175.4	43	335
170102010404	LostCreek	31111	1523	761.48	24.4	150.6	29	225
170102010305	West Valley	30536	831.8	415.88	13.4	82.3	29	225
170102010202	Blacktail	24628	580.8	290.4	9.3	57.4	29	225
100200060302	Basin – Boulder	26628	563.1	281.56	9.0	55.7	29	225
100200060503	BoulderMid	35203	853.4	426.69	13.6	84.4	29	225
100200060502	Elkhorn	24413	791.9	395.97	12.7	78.3	29	225
100200060301	RedRock	19338	640.7	320.37	10.3	62.4	29	225
100200050106	Beall	39767	2889.9	1444.93	46.3	285.8	29	225
100200041105	WillowGulch	10925	878.9	439.47	14.1	86.9	29	225

Direct and Indirect Effects

Using procedures and assumptions outlined in the analysis above, extreme concentrations should never occur during Beaverhead-Deerlodge Forest weed spraying activities, unless a spill directly into a stream from something like a vehicle accident were to occur. Proposed treatments may still result in herbicide concentrations that are detectable at low levels in the waters of some 6th code HUCs. Assuming application guidelines and mitigations defined in the EIS are followed, there is little risk that significant impacts or mortality to fish should occur from the proposed activities.

It seems likely that no mortality would occur for sensitive fish, since the threshold level chosen (0.12 ppm) is 15 – 20 times less than LC50 values for cutthroat and other species most sensitive to the most toxic herbicide proposed for use. Little can be presumed, however, regarding potential effects on growth rates or development in the early life stages of fish if they are exposed 0.12 ppm. There are very few "no observable effects" studies that are applicable to what would likely occur in the field. Data that is available was derived from chronic bioassays with exposures lasting for multiple weeks. In reality exposures that might occur on the Forest are expected to last only a few hours. Based on the information that is available and discussions with other biologists, it is possible that some effect to individuals may occur, but it is likely to have little effect on survival and the long term viability of our sensitive fish species.

Susceptibilities to chemical weed treatment are not as well defined for amphibian species, as with other aquatic organisms. Their life histories involve both aquatic and terrestrial life stages, making them susceptible to toxicants in both environments. Many amphibians have vascularization in the epidermis of the skin, with little keratinization, simplifying uptake of many toxicants. Much of the available data has limited usefulness in helping determine impacts in this EIS, since it is not specific to the species we have. Given this, some assumptions must be made based on the information that is available. Aquatic toxicities noted in the table above showed trout to be more sensitive to 2,4-D than chorus frogs. Mayer and Ellersieck (1986) stated that amphibians tended to be less sensitive to 410 different chemicals evaluated in their study than invertebrates, crustaceans and fish.

Based on short exposure times and likely concentration levels that are well below those shown to cause adverse effects to aquatic organisms, it is concluded that risk for adverse effects to sensitive fish and amphibian species in surface waters is low enough to be considered discountable.

Effects on terrestrial life stages of amphibians must be viewed somewhat differently. It is likely that adult or subadult amphibians within riparian zones will come into direct contact with herbicides during or after application. Chemical contamination was reviewed in Cook (1981) and others, (as reported in Maxell 2000). Effects,(although not necessarily from the specific chemicals proposed for use in this document) ranged from mortality to reduced disease resistance, reproductive ability, morphological abnormalities and other things (Maxell 2000). While amphibians' vulnerability to chemicals is well documented, there is no data that allows us to effectively define what effects – if any— might occur from incidental contact with the herbicides proposed for use in this EIS. Many assume that criteria for mammals, birds, and fish will incorporate the protection needed for amphibians (Maxell 2000). For this analysis, it is assumed some risk to individuals may be present but impacts aren't predictable.

Within the selected alternative, direct contact with herbicides by amphibians will be largely incidental. The broader more continuous coverage of aerial application will not occur in riparian zones, where sensitive amphibians are likely to be found in large numbers. Ground application consists largely of spot application, reducing risk of exposure for high numbers of individuals. Western Toads and possibly other species can occur in extremely high densities around water bodies, shortly after they metamorphose from tadpoles into young adults. This situation can pose a risk to relatively large number of individuals during ground application in the riparian zones. The occurrence of high concentrations of amphibians will likely be observed during required inspections immediately adjacent to water bodies, prior to ground application. In these cases treatment will be postponed (within the area occupied) until the individuals have adequately dispersed. Or weeds can be hand pulled or treated by wick application.

Information suggesting any potential for significant negative effects to aquatic insects (a food source for fish and amphibians) is largely lacking. Bioassay information is typically limited to a few species. The data available indicates aquatic invertebrates will not be affected by concentration levels of Tordon, dicamba, 2-4D, or chlopyralid that might occur in our streams. It is possible, negative effects to some aquatic insect species may occur on a very localized basis. However, rapid re-colonization from upstream areas would be expected, reducing the risk for indirect effects. Thus, there should be little to no change in food supply levels and indirect effects to sensitive fish and amphibians from reductions in food sources are considered discountable.

Picloram is an herbicide with potential to damage to non-target plant species. As is the case with any herbicide,the likelihood of damage to non-target plant species is related directly to the difference between the sensitivity of target species —which dictates the application rate —and the sensitivity of the potential non-target species. Although picloram is more toxic to broadleaf plants than grains or grasses, direct spray at application rates between 0.3 and 1.5 lb a.e./acre are likely to damage all groups of terrestrial plants although the most severe damage would probably be apparent in broadleaf plants. It is unlikely, that given common application rates used on the Forest in the past; and label restrictions that upland and riparian vegetation will be altered to an extent that is measurable. Thus, indirect effects on sensitive aquatic species are considered discountable.

Cumulative Effects

A wide variety of land management activities continue on private lands in western Montana. Projects occurring on private lands continue to pose risks to fish and amphibians through a variety of pathways. The extent of effects varies and is generally unknown and unpredictable. These impacts may be reduced from current levels through habitat conservation planning for aquatic species on non-federal lands or in some cases through voluntary project specific mitigation by private landowners. In regard to weed spraying activities coordination between the Forest Service efforts and private landowners weed control efforts should help ensure that the conditions described in this BA are met.

In many of the drainages there will be weed treatments by private landowners. Modeled treatments with herbicides suggest any concentrations that reach streams will remain well below levels where acute or adverse effects to fish and amphibians would occur. Negative effects on growth might, in certain instances, shift competitive advantages

toward non-native species. However, the risk for affecting growth and survival of sensitive fish and amphibian species on federal lands is considered discountable due to expected short duration of exposure and concentrations remaining below.

Northern Leopard frogs have not recently been found on the Beaverhead-Deerlodge National Forest even though portions of the Forest represent historic range. Until they are identified as being present, the biological determination for this species is "no impact".

DETERMINATION OF EFFECT

Table 6. - BIOLOGICAL RISK ASSESSMENT

Species	Probability of Effect +	Consequence of Effect +	Cumulative Effect +	Determination of Effect *
Westslope cutthroat	Low	Low	Low	May Impact Individuals or Habitat, But Will Not Likely Contribute to a Trend Towards Federal Listing or Reduced Viability for the species
Arctic grayling	Low	Low	Low	May Impact Individuals or Habitat, But Will Not Likely Contribute to a Trend Towards Federal Listing or Reduced Viability for the species
Northern Leopard Frog	Low	Low	Low	No Impact
Western Toad	Moderate	Low	Low	May Impact Individuals or Habitat, But Will Not Likely Contribute to a Trend Towards Federal Listing or Reduced Viability for the species Population or

				Species

CONSERVATION MEASURES

The following conservation measures are mandatory for a determination of No Impact or May Impact Individuals or Habitat, But Not Likely to Lead to a Trend Toward Federal Listing or Reduced Viability for the Species for Sensitive wildlife species:

A 300-foot, no aerial treatment buffer will be used next to perennial streams. To prevent application prior to extreme rain events, herbicide applicators will obtain a weather forecast for the treatment area prior to initiating a spraying project and follow label instructions. Additional mitigation is required for the following streams.

Aerial herbicide application near streams, ponds, or wetlands will occur only when winds are 6 mph or less and blowing away from these areas. Aircraft smokers, smoke bombs, or on-site wind monitoring will be used to determine wind direction near sensitive aquatic resources.

A field inspector will be present during all periods aerial application is occurring to monitor drift, using 12” x 12” spray detection cards placed in buffer areas along any stream or lake comprising a sport fishery, or waters important for Threatened, Endangered or Sensitive (TES) aquatic species. . Cards will be placed prior to treatment and be sufficient in number and distribution to adequately determine when drift of herbicide into the buffer area exceeds acceptable levels. They will be monitored during aerial application to evaluate drift. Aerial application along waters important for TES aquatic species will be suspended and procedures changed whenever:

- 50% or more, of the spray detection cards placed between 200 and 250 feet from the stream display droplet contact; or
- 30% or more, of the spray detection cards placed between 150 and 200 feet from the stream display droplet contact, or
- 10% or more, of the spray detection cards placed between 50 and 100 feet from the stream, display droplet contact, or
- Any spray detection card placed within 10 feet of the stream displays droplet contact.

Aerial herbicide application along any stream or lake will be suspended and procedures changed, whenever any spray detection card within 10 feet of the water body displays droplet contact.

Within any 4 month period, the total application of picloram (the active ingredient in Tordon 22K) will not exceed 335 lbs, in each of the following 6th code watersheds; Stony, Gird, Boulder Low, South Boulder, Middle Fork Rock, Unnamed (# 170101010609), and Henderson. Similarly, use of Tordon 22k will not exceed application of 225 lbs of the active ingredient picloram, within the same 4 month period, in the Lost Creek, West Valley, Blacktail, Basin-Boulder, Boulder Mid, Elkhorn, Red Rock, Beall, and Willow Gulch 6th code watersheds. If treatment beyond the allowable amount of picloram is necessary in any of these watersheds, applicators will switch to another herbicide so that effects on westslope cutthroat trout and other sensitive aquatic species will be discountable.

When pretreatment surveys for ground application immediately adjacent to a water body within riparian zones confirm the presence of any leopard frogs; mature adult western toad or concentrations of recently metamorphosed immature adult toads, the extent of distribution within the proposed treatment area will be defined and marked. Ground

application of herbicides within the marked area will be delayed until individuals disperse, or wick application or hand pulling will be employed. The district fisheries biologist and weed coordinator will be notified within 2 days and the site will be documented.

Prepared by:
/s/ Jim Brammer
Jim Brammer
BDNF Fisheries Biologist

Date: ______________________

LITERATURE CITED

Behnke, R.J. 1992. Native Trout of Western North America. American Fisheries Society, Monograph 6.

Bjorn, T.C. and G. A. Liknes. 1986. Life history, status and management of westslope cutthroat trout. In: J. S. Griffith ed, The ecology and management of interior stocks of cutthroat trout. American Fisheries Society, Western Division Special publication; 57-64.

Black, J. H. 1970a. Some aspects of the distribution, natural history and zoogeography of the toad genus *Bufo* in Montana. Master of Science thesis, University of Montana. Missoula, Montana. 70pp.

Boyer, R. and C.E. Grue. 1995. The need for water quality criteria for frogs. Environmental Health Perspectives. 103: 352-357.

Carey, C. and C.J. Bryant. 1995. Possible interrelations among environmental toxicants, amphibian development and decline of amphibian populations. Environmental Health Perspectives 103 (suppl. 4): 13-17.

Cooke, A.K. 1981. Tadpoles as indicators of harmful levels of pollution in the field. Environmental Pollution (Series A) 25: 123-133.

Corn, P.S., M. Jennings and E. Muths. 1997. Survey and assessment of amphibian populations in Rocky Mountain National Park. Northwestern Naturalist 78:34-55.

Dole, J.W. 1971. Dispersal of recently metamorphosed leopard frogs *Rana pipiens*. Copeia, 1971(2): 221-228.

Hall, R.J. and P.F.P. Henry. 1992. Assessing effects of pesticides on amphibians and reptiles: Status and needs. Herpetological Journal 2: 65-71.

Kaya, C.M. 1990. Staus report on fluvial arctic grayling (*Thymallus arcticus*) in Montana. Montana Department of Fish, Wildlife and Parks, Helena, MT.

Lee, D.C. and B.E. Reiman. 1997. Population viability assessment of salmonids by using probabilistic Networks. North American Journal of Fisheries Management. 17: 1144-1157.

Liknes, G.A. 1984. The present status and distribution of westslope cutthroat trout (*Salmo clarki lewisi*) east and west of the continental divide in Montana. Montana Department of Fish, Wildlife and Parks. Helena, MT.

Liknes, G.A. and P.J. Graham. 1988. Westslope cutthroat trout in Glacier National Park, Montana. American fisheries Society Symposium, 4 p.

Loeffler C. (ed.) 1998. Conservation plan and agreement for the management and recovery of the Southern Rock Mountain population of the boreal toad (*Bufo boreas boreas*). Boreal Toad Recovery Team. 80 pp.

Maxell, B.A. 2000. Management of Montana's Amphibians. A review of risk factors to population viability. USDA Forest Service, Northern Rockies Region, Missoula, MT. 161 pp.

Mayer, F.L. and M.R. Ellersieck. 1986. Manual of Acute Toxicity: Interpretation and Data Base for 410 Chemicals and 66 Species of Freshwater Animals. USDI Fish and Wildlife Service, Resource Publication 160. 33 pages plus appendices.

Metter, D.E. 1961. Water levels as an environmental factor in breeding season of *Bufo boreas boreas*. Copeia 1961: 488.

Nussbaum, R.A., E.D. Brodie, and R.M. Storm. 1983. Amphibians and riptiles of the Pacific Northwest. University Press of Idaho, Moscow, Idaho. 332 pp.

Reiman, B.E. and K.A. Apperson. 1989. Status and analysis of salmonid fishes: Westslope cutthroat trout synopsis and analysis of fishery information. Idaho, Department of Fish and Game, Job Performance Report, Project F-73-R-11, subproject No. II, Job No. 1. Boise, Idaho.

Ross, D.A., T.C. Esque, R.A. Fridell, and P. Hovingh. Historical distribution, current status, and a range extension of *Bufo boreas* in Utah. Herpetological Review 26(4): 187-189.

Seburn, C.N.L., D.C. Seburn, and C.A. Paszkowski. 1997. Northern leopard frog (*Rana pipiens*) dispersal in relation to habitat. In: D.M. Greeen (ed.) amphibians in decline: Canadian studies of a global problem. Society for the Study of Amphibians and Reptiles, Herpetological Conservation 1: 64-72.

Shepard, B.B., B. Sanborn, L. Ulmer, and D.C. Lee. 1997. Status and risk of extinction for westslope cutthroat trout in the upper Missouri River basin, Montana. North American Journal of fisheries Management 17: 1158-1172.

Stebbins, R.C. 1985. A field guide to western reptiles and amphibians. Houghton Mifflin Company, Boston. 336 pp.

Stebbins, R.C. and N.W. Cohen. 1995. A natural history of amphibians. Princeton University Press. Princeton, NJ. 316 pp.

Stuart, J.N. and C.W. Painter. 1994. a review of the distribution and status of the boreal toad, *Bufo boreas boreas*, in New Mexico. Bulletin of the Chicago Herpetological Society 29(6):113-116.

Vincent, R.E. 1962. Biogeographical and ecological factors contributing to the decline of arctic grayling (*Thymallus arcticus*) in Montana and Michigan. Ph.D. dissertation, University of Michigan, Ann Arbor, MI.

APPENDIX A

Modeled results for, 6th code HUCs that could exceed 0.12 ppm for picloram.. Table shows predicted amounts of picloram that may reach streams in each HUC, the discharge necessary to dilute the picloram sufficiently to meet 0.12 parts per million, and the estimated discharge that would result from a 2 year storm event covering 3840 acres.

Fisheries Biological Evaluation
Appendix M-23

HUC 6 CODE	NAME	Total HUC Acres	square miles	TREAT-MENT	Acres Treated	Total App. in lbs of Tordon	lbs Tordon Delivered to stream	CFS REQUIRED @ 6% OVERLAND DEL. @ .5 LBS/ACRE	2 YR STORM EVENT DIS-CHARGE (CFS)
170102010404	Lost Creek	31111	48.61	Aerial	1469.4	734.70	25.7	158.9	
170102010404	Lost Creek	31111	48.61	Ground	53.6	26.78	0.9	5.8	
	Lost Creek Total							164.7	29
170102010305	West Valley	30536	47.71	Aerial	465.9	232.95	8.2	50.4	
170102010305	West Valley	30536	47.71	Ground	365.9	182.93	6.4	39.6	
	West Valley Total							90	29
170102010904	Gold*-Deerlodge	49505	77.35	Ground	424.9	212.45	7.4	46.0	
	Gold*-Deerlodge Total							46.0	29
170102010506	Fred	40449	63.20	Ground	421.4	210.71	7.4	45.6	
	Fred Total							45.6	29
170102010205	GermanGulch	26272	41.05	Aerial	146.8	73.40	2.6	15.9	
170102010205	GermanGulch	26272	41.05	Ground	178.8	89.39	3.1	19.3	
	GermanGulch Total							35.2	29
100200040602	Johnson-Bighole	26369	41.20	Aerial	62.3	31.15	1.1	6.7	
100200040602	Johnson-Bighole	26369	41.20	Ground	306.6	153.30	5.4	33.2	
	Johnson-Bighole Total							39.9	29
100200040401	UpperTrail	16759	26.19	Aerial	35.20	17.60	0.6	3.8	
100200040401	UpperTrail	16759	26.19	Ground	248.55	124.28	4.3	26.9	
	UpperTrail Total							30.7	29
170102010406	Cottonwood-Helena	22290	34.83	Aerial	138.2	69.10	2.4	14.9	
170102010406	Cottonwood-Helena	22290	34.83	Ground	181.6	90.80	3.2	19.6	
	Cottonwood-Helena Total							34.5	29
170102010403	GirardGulch*	19464	30.41	Aerial	106.2	53.10	1.9	11.5	
170102010403	GirardGulch*	19464	30.41	Ground	257.8	128.90	4.5	27.9	
	GirardGulch Total							39.4	29
170102010202	Blacktail*	24628	38.48	Aerial	327.1	163.55	5.7	35.4	
170102010202	Blacktail*	24628	38.48	Ground	253.7	126.85	4.4	27.4	
	Blacktail Total							62.8	29
100200070701	Antelope	14456	22.59	Ground	321.0	160.49	5.6	34.7	
	Antelope Total							34.7	29
100200060503	BouderMid*	35203	55.00	Aerial	794.1	397.05	13.9	85.9	
100200060503	BouderMid*	35203	55.00	Ground	59.3	29.64	1.0	6.4	
	BouderMid Total							92.3	29
100200060502	Elkhorn	24413	38.15	Aerial	551.2	275.60	9.6	59.6	
100200060502	Elkhorn	24413	38.15	Ground	240.7	120.37	4.2	26.0	
	Elkhorn Total							85.6	29
100200060402	NFLittleBoulder	11796	18.43	Aerial	178.5	89.25	3.1	19.3	

HUC 6 CODE	NAME	Total HUC Acres	square miles	TREAT-MENT	Acres Treated	Total App. in lbs of Tordon	lbs Tordon Delivered to stream	CFS REQUIRED @ 6% OVERLAND DEL. @ .5 LBS/ACRE	2 YR STORM EVENT DIS-CHARGE (CFS)
100200060402	NFLittleBoulder	11796	18.43	Ground	134.6	67.31	2.4	14.6	
	NFLittleBoulder Total							33.9	29
100200060302	Basin-Boulder	26628	41.61	Aerial	265.5	132.75	4.6	28.7	
100200060302	Basin-Boulder	26628	41.61	Ground	297.6	148.81	5.2	32.2	
	Basin-Boulder Total							60.9	29
100200060301	RedRock	19338	30.22	Aerial	443.5	221.75	7.8	48.0	
100200060301	RedRock	19338	30.22	Ground	197.2	98.62	3.5	21.3	
	RedRock Total							69.3	29.0
100200060105	SFRedRock	14569	22.76	Ground	331.6	165.82	5.8	35.9	
	SFRedRock Total							35.9	29
100200060104	LowlandLow*	16799	26.25	Ground	340.6	170.29	6.0	36.8	
	LowlandLow Total							36.8	29
100200060102	Powderhorn	12093	18.90	Ground	337.8	168.90	5.9	36.5	
	Powderhorn Total							36.5	29
100200050106	Beall	39767	62.14	Aerial	2879.2	1439.60	50.4	311.4	
100200050106	Beall	39767	62.14	Ground	10.7	5.33	0.2	1.2	
	Beall Total							312.6	29
100200041105	WillowGulch*	10925	17.07	Ground	878.9	439.47	15.4	95.1	
	WillowGulch Total							95.1	29
100200040601	Tie	20067	31.35	Ground	333.1	166.56	5.8	36.0	
	Tie Total							36.0	29
100200040407	TrailLow	18603	29.07	Aerial	100.5	50.25	1.8	10.9	
100200040407	TrailLow	18603	29.07	Ground	331.1	165.53	5.8	35.8	
	TrailLow Total							46.7	29
100200040406	Moosehorn*	15503	24.22	Aerial	140.2	70.10	2.5	15.2	
100200040406	Moosehorn*	15503	24.22	Ground	183.6	91.82	3.2	19.9	
	Moosehorn Total							35.1	29
100200071403	NMeadow	25114	39.2	Ground	295.69	147.85	5.2	32.0	
	NMeadow Total							32.0	
100200030109	RubyMid*	33407	52.20	Aerial	336.2	168.10	5.9	36.4	
100200030109	RubyMid*	33407	52.20	Ground	114.8	57.42	2.0	12.4	
	Ruby Mid Total							48.8	29
170102021204	Stony	21678	33.87	Aerial	1016.1	508.05	17.8	109.9	
170102021204	Stony	21678	33.87	Ground	35.4	17.71	0.6	3.8	
	Stony Total							113.7	43
170102021203	CornishGulch	11139	17.40	Aerial	330.9	165.45	5.8	35.8	
170102021203	CornishGulch	11139	17.40	Ground	168.3	84.14	2.9	18.2	
	Cornish Gulch Total							50	43

HUC 6 CODE	NAME	Total HUC Acres	square miles	TREAT-MENT	Acres Treated	Total App. in lbs of Tordon	lbs Tordon Delivered to stream	CFS REQUIRED @ 6% OVERLAND DEL. @ .5 LBS/ACRE	2 YR STORM EVENT DIS-CHARGE (CFS)
170102021202	SluiceGulch*	16102	25.16	Aerial	426.8	213.40	7.5	42.6	
170102021202	SluiceGulch*	16102	25.16	Ground	25.4	12.70	0.4	2.7	
	Sluice Gulch Total							48.9	43
170102020502	Gird*	20772	32.46	Aerial	462.0	231.00	8.1	50	
170102020502	Gird*	20772	32.46	Ground	399.6	199.81	7.0	43.2	
	Gird Total							93.2	43
170102020304	BoulderLow*	12270	19.17	Aerial	101.2	50.60	1.8	10.9	
170102020304	BoulderLow*	12270	19.17	Ground	717.6	358.79	12.6	77.6	
	BoulderLow Total							88.5	43
170102020303	Sboulder	13355	20.87	Aerial	287.0	143.50	5.0	31.0	
170102020303	Sboulder	13355	20.87	Ground	738.2	369.12	12.9	79.8	
	Sboulder Total							110.8	43
170102020204	RockMid*	13262	20.72	Aerial	573.2	286.60	10.0	62.0	
170102020204	RockMid*	13262	20.72	Ground	163.1	81.55	2.9	17.6	
	Rock Mid Total							79.6	43
170102020104	Flint	8446	13.20	Aerial	424.4	212.20	7.4	45.9	
170102020104	Flint	8446	13.20	Ground	133.4	66.70	2.3	14.4	
	Flint Total							60.3	43
170102020609	Unnamed	25555	39.93	Aerial	1002.5	501.25	17.5	1083.4	
170102020609	Unnamed	25555	39.93	Ground	339.6	169.79	5.9	36.7	
	UnNamed Total							145.1	43
170102020501	Henderson	19288	30.14	Aerial	1155.5	577.75	20.2	125.0	
170102020501	Henderson	19288	30.14	Ground	618.1	309.07	10.8	66.8	
	Henderson Total							191.8	43
170102020403	Unnamed	19145	29.91	Aerial	322.9	161.45	4.7	34.9	
170102020403	Unnamed	19145	29.91	Ground	122.8	61.41	2.1	13.3	
	UnNamed Total							48.2	43

File Code: 2670
Route To: 1950

Date: March 26, 2002

Subject: Biological Assessment – Noxious Weed Control Program EIS

To: Forest Supervisor & ID Team Leader – Leaf Magnuson

SUMMARY

Determination of Effects

Implementation of the proposed Federal action **WILL HAVE NO EFFECT** on proposed mountain plover; **IS NOT LIKELY TO ADVERSELY AFFECT** endangered gray wolves, [threatened grizzly bear, Canada lynx and bald eagle]; and **IS NOT LIKELY TO JEOPARDIZE THE CONTINUED EXISTENCE** of nonessential experimental gray wolves.

Consultation Requirements

In accordance with the Endangered Species Act (ESA), its implementation regulations, and FSM 2671.4, the Beaverhead-Deerlodge National Forest is required to request written concurrence from the United States Fish and Wildlife Service (FWS) with respect to determinations of potential effects on gray wolf, grizzly bear, Canada lynx, bald eagle and mountain plover.

Need For Re-Assessment Based On Changed Conditions

The Biological Assessment findings are based on the best current data and scientific information available. A revised Biological Assessment must be prepared if: (1) new information reveals affects, which may impact threatened, endangered, and proposed species or their habitats in a manner or to an extent not considered in this assessment; (2) the proposed action is subsequently modified in a manner that causes an affect, which was not considered in this assessment; or (3) a new species is listed or habitat identified, which may be affected by the action.

INTRODUCTION

The purpose of this Biological Assessment is to review the possible effects of the proposed federal action on threatened, endangered, and proposed species and their habitats. Threatened, endangered, and proposed species are managed under the authority of the Federal Endangered Species Act (PL 93-205, as amended) and the National Forest Management Act (PL 94-588). Under provisions of the Endangered Species Act (ESA), Federal agencies shall use their authorities to carry out programs for the conservation of listed species, and shall insure any action authorized, funded, or implemented by the agency is not likely to: (1) adversely affect listed species or designated critical habitat; (2)

jeopardize the continued existence of proposed species; or (3) adversely modify proposed critical habitat (16 USC 1536).

This Biological Assessment analyzes the potential effects of the proposed federal action on all threatened, endangered, and proposed species known or suspected to occur in the proposed action influence area (Table 1). This species list was confirmed July 30, 2001 by e-mail. Life history information on these species can be found in the reference document "The Distribution, Life History, and Recovery Objectives For Region One Threatened, Endangered, and Proposed Terrestrial Wildlife Species" (2001) and is incorporated by reference in this Biological Assessment.

Table 1. Threatened, Endangered And Proposed Species Known Or Suspected To Occur Within The Influence Area Of The Proposed Action.

Species	Status	Occurrence
Gray Wolf *(Canis lupus)*	Nonessential Experimental & Endangered	Packs in the Madison, Gravelly & Boulder Ranges, individuals elsewhere
Grizzly Bear (*Ursus arctos*)	Threatened	In the Madison and Gravelly Ranges
Canada Lynx (*Lynx canadensis*)	Threatened	In the Pintler & North Flint Ranges, scattered elsewhere
Bald Eagle (*Haliaeetus leucocephalus*)	Threatened	Nests on the Madison & Wisdom RD's, individuals elsewhere
Mountain Plover (*Charadrius montanus*)	Proposed - Threatened	Not on the Forest

PROPOSED PROJECT

Proposed Project

The Beaverhead-Deerlodge National Forest proposes to use all appropriate methods of noxious weed (see Table 2) control, including aerial application of chemical herbicides, prevention, detection, treatment and monitoring in addition to chemical treatment. Noxious weeds do not follow ownership boundaries therefore Integrated Weed Management prescribes coordination between public and private land managers. Because herbicide treatment is already part of existing weed treatment we will compare proposed alternatives by methods of application.

Table 2. Montana State Noxious Weeds targeted on the Beaverhead-Deerlodge National Forest.

Common Name	Scientific Name
Category 1*	*Noxious weeds currently established and generally widespread in many counties of the State
Leafy spurge	*Euphorbia esula*
Canada thistle	*Cirsium arvense*

Russian knapweed	*Centaurea repens*
Spotted knapweed	*Centaurea maculosa*
Diffuse knapweed	*Centaurea difussa*
Field bindweed	*Convolulus arvensis*
Whitetop (hoary cress)	*Cardaria draba*
Dalmation toadflax	*Linaria dalmatica*
St. Johnswort (goatweed)	*Hypercum perforatum*
Sulfur cinquefoil	*Potentilla recta*
Common tansy	*Tanacetum vulgare*
Ox-eye daisy	*Chrysanthemum leucanthemum*
Houndstongue	*Cynogbssum officinale*
Category 2*	*Noxious weeds recently introduced or rapidly spreading from current infestation sites
Dyer's woad	*Isatis tinctoria*
Purple loosestrife (Lythrum)	*Lythnum salicaria, L. virgatum* and crosses
Tansy ragwort	*Senecio jacobia*
Meadow hawkweed complex	*Hieracium pratense, H. floribundum, H. piloselloides*
Orange hawkweed	*Hieacium aurantiacum*
Tall buttercup	*Rannunculus acris*
Tamarisk	*Tamarix* spp
Category 3*	*Noxious weeds not detected or found only in small, scattered, Localized infestations
Yellow starthistle	*Centaurea solstitalis*
Common crupina	*Crupina vulgaris*
Rush skeletonweed	*Chondeilla juncea*
County Control*	*Noxious weeds established for control by county weed boards
Yellow toadflax	*Linaria vulgaris*
Musk thistle	*Cardurus nutans*
Field scabious	*Knautia arvensis*
Black henbane	*Hyocyamus niger*

Burdock	*Arctium minus*
Common mullein	*Verbascum thapsus*
Bull thistle	*Cirsium vulgare*

The EPA has determined the risk associated with proper aerial application of registered chemical herbicides. EPA registered herbicides supply specifications for application on the label. The website: http://infoventures.com/e-hlth/ has an Environmental Health Reference and Resource Materials section where you can find this information.

Improper aerial application is not anticipated. All herbicide applicators whether Forest Service or contractor employees, will follow label instructions to prevent negative effects. Field inspectors will be on-site during all aerial applications to monitor compliance with label specifications and effects.

The Risk Assessment for Herbicide Use in Forest Service Regions 1, 2, 3, 4, and 10 and on Bonneville Power Administration Sites printed in 1992 provides detailed information about herbicide use. This large document is available in the project file at the BDNF Supervisor's Office in Dillon. There is also a website address for that publication: http://www.fs.fed.us/foresthealth/pesticide/health.htm

Direct Control: Direct methods will be applied annually on 15 –16,000 (37%) of the 43,012 weed-infested acres on the Beaverhead-Deerlodge National Forest. This projection includes annual aerial application of herbicides on 9,000 acres and ground application up to 7,000 acres. Mechanical, biological and cultural treatments will be applied when practical and are included in the annual acres identified for treatment.

The proposal considers all EPA registered chemicals approved for weed control, including herbicides developed and approved for use in the future. Registered herbicides are shown in Table 3. All herbicides would be applied according to label instructions and specifications or Forest Service policy whichever provides the most protection.

Table 3. EPA registered chemicals being considered for weed control on the Beaverhead-Deerlodge National Forest

Common Name	Trade Name
2,4-D	Hi Dep, Weedar 64, Weed RHAP
Chlorsulfuron	Telar
Clopyralid	Stinger, Reclaim, Transline
Dicamba	Banvel, Banex, Trooper
Glyphosphate	Roundup, Rodeo, Accord
Haxxzinone	Velpar, Velpar ULW, Velpar L, Pronone 10G
Imazapyr	Arsenal, Chopper, Contain
Metsulfuron methyl	Escort, Ally
Picloram	Tordon, Grazon, Access, Pathway
Pyridinecarboxylic acid	Pleateau
Sulfometuron methyl	Oust
Triclopyr	Garlon, Grazon

Adjuvants	
Surfactants	
Dye	

Some biological controls in use are: Knapweed gall flies (*Urophora affinis* and *U. quadrifasciata*), Knapweed gallfly (*Latin binomial*,), and Leafy spurge moth (*Apthona nigris-cutis*.) All biological agents would be released according to APHIS requirements, or Forest Service policy, whichever is more restrictive. New agents may be substituted if more appropriate, if current agents are not available or have been found ecologically harmful.

The proposal allows new sites to be treated as soon as they are identified. Mitigation measures for treatment apply to new sites as appropriate.

Indirect Control: Indirect methods comprise detection, prevention, and education. Survey, detection, and monitoring activities will be accomplished on about half of the infested acres every year. Prevention measures include OHV travel restrictions, vehicle cleaning, livestock management, and other related practices. Current education programs, publications, postings news releases and cooperation with other agencies will continue until monitoring indicates a need for change. The acres and type of control measures implemented on National Forest System lands in this proposal are displayed in Table 4.

Mitigation measures and an aquatic monitoring plan are identified and will be utilized as appropriate for specific site conditions.

Selection methods for aerial application sites

The first test for aerial application is whether the chemical can be delivered to the target weed. If overstory vegetation prevents herbicides from getting to the weed then aerial application is not warranted. This primarily eliminates weed infestations under moderate to heavy forest canopy.

When a site is listed for potential aerial application it falls into one of the following categories:

1. The infestation covers a large area and would be most efficiently treated from the air. There is no acre limit for this decision, but these sites are generally over 20 acres with fairly dense weed coverage.

2. The infestation is located on rough, steep terrain preventing ground application and too dangerous for employees on foot.

3. The infestation is very remote requiring an inordinate amount of time for crews to arrive and apply ground treatment.

4. The potential for a weed infestation to logically fit into a coordinated weed control program with adjacent landowners. These sites might currently be treated by ground methods. They would only be more efficiently treated by air if adjacent non-Forest land were treated at the same time.

Table (4). Summary of the features of the Noxious Weed Project, Beaverhead-Deerlodge National Forest. February 27, 2002.

Features	Quantity
Biological Control	125 acres
Mechanical Control	35 acres
Ground Herbicide Application	6,831 acres
Aerial Herbicide Application	9,028 acres
Total Annual Treatment	16,019 acres

Project Area

The proposal includes lands on the Beaverhead-Deerlodge National Forest. This is approximately 3.3 million acres of National Forest lands in Beaverhead, Deer Lodge, Granite, Jefferson, Madison, Powell, and Silver Bow Counties in Southwestern Montana.

SPECIES ASSESSMENT

Gray Wolf (*Canis lupus*)

- **Population and Habitat Status**

Table (5). Gray Wolf; Population and Habitat Status.

Wolf Activity	Den Site	Rendezvous Site
Pack (Madison, Gravelly, Boulder Ranges), Individual (scattered throughout Forest)	Known (Gravelly, Boulder) Potential (rest of Forest)	Potential (near existing dens or if other dens are found)

- Wolf activity is increasing on the Forest with a new pack in the Gravelly Range, existing pack in the Boulder Range, and packs from Yellowstone

National Park traveling into the Madison Range. Prey available on the Forest appears to be stable to increasing (elk, mule deer, moose).

- **Direct, Indirect, and Cumulative Effects Analysis**

  - There would be no direct effect to wolves from spraying noxious weeds. There would be disturbance in areas of spray treatment, so these areas would be unavailable to wolves during the time of the treatment. The majority of the disturbance would occur next to roads and trails. Controlling noxious weeds would maintain forage throughout the Forest, which would help to maintain prey species.

  - Cumulative Effects - Spraying of noxious weeds on the Forest would be in addition to spray programs off the Forest. This would increase disturbance throughout the area. It would also increase the areas where forage would be maintained for prey species. The proposed noxious weed control program would increase disturbance into areas that have not had disturbance in the past from weed control activities (aerial spray areas). This disturbance would be of short duration.

- **Determination of Effects**

  - I have determined implementation of the proposed Federal Action **Is Not Likely To Adversely Affect** endangered gray wolves and **Is Not Likely To Jeopardize The Continued Existence** of nonessential experimental gray wolves. My determination is based on the following rationale:

    1) The proposal is short-term duration in localized areas,

    2) Has little potential to impact denning or rendezvous sites,

    3) Does not impact prey species availability.

    4) "Management of wolves within this area, as well as, the entire nonessential area is not expected to impact current and proposed land uses within the Forest, nor are current and proposed land uses expected to impact wolf management (USDI Fish and Wildlife Service 1994).

- **Recommendations For Removing, Avoiding, or Compensating Adverse Effects**

  - Avoid spraying activities in the areas of known dens or rendezvous sites when wolf activity may be present.

Grizzly Bear (*Ursus arctos*)

Population and Habitat Status

Table (6). Grizzly Bears; Population and Habitat Status.

Bear Management Unit	Sub-unit	Visual Sightings	Den Sites	Mortality
Hillgard	Hillgard-1	Yes	Suspected	None on B-D NF portion
Outside Recovery Area (remaining NF)	N/A	Yes, confirmed in Gravelly Range	Unknown	1985 in Gravelly Range (management action)

- Grizzly bear activity is increasing on the Forest with bears confirmed in the Madison and Gravelly Ranges and reports elsewhere. Habitat exists throughout the Forest.

- **Direct, Indirect, and Cumulative Effects Analysis**

Table (7). Grizzly Bear; National Forest Plan Standards, Incidental Take Statements, And Other Plan Standards.

Standards	Pre-Treatment	During-Treatment	Post-Treatment	Compliance
Forest Plan Standards – Beaverhead & Deerlodge NFs	No Standards in Forest Plans for grizzly bears			
Incidental Take Statements	None			
Other Plan Standards	Recovery Plan (1993)			
	1. Maintain & Improve Habitat			Control and prevention of noxious weeds would maintain & improve habitat
	2. Minimize griz-human conflict potential			Providing native vegetation maintains a non-human foraging opportunity
	3. Resolve griz-human conflict			

- There would be no direct effect to grizzly bears from spraying noxious weeds. There would be disturbance in areas of spray treatment, so these areas would be unavailable to grizzly bears during the time of the

treatment. The majority of the disturbance would occur next to roads and trails. Controlling noxious weeds would maintain forage throughout the Forest, which would help to maintain prey species and foraging opportunities.

- Cumulative Effects - Spraying of noxious weeds on the Forest would be in addition to spray programs off the Forest. This would increase disturbance throughout the area. It would also increase the areas where forage would be maintained for both grizzlies and prey species. The proposed noxious weed control program would increase disturbance into areas that have not had disturbance in the past from weed control activities (aerial spray areas). This disturbance would be of short duration.

- **Determination of Effects**

  - I have determined implementation of the proposed Federal Action **Is Not Likely To Adversely Affect** the grizzly bear. My determination is based on the following rationale:

1. The proposal is short-term duration in localized areas,
2. Has little potential to impact denning or foraging habitat,
3. Has little potential to impact prey species,
4. Would maintain or improve habitat.

- **Recommendations For Removing, Avoiding, or Compensating Adverse Effects**

  - None.

Canada Lynx (*Lynx canadensis*)

- **Population and Habitat Status**

Table (8). Canada Lynx; Population and Habitat Status.

Canada Lynx Activity	Project Within Lynx Elevation Zone	Foraging Habitat	Denning Habitat
Majority of lynx activity on the B-D NF is located in the Pintler and North Flint Ranges, individuals scattered throughout rest of the B-D NF	Portions of the treatment areas would be within the elevation zone and within or near lynx movement habitat	No – majority of treatment would occur within sagebrush/grassland	No – majority of treatment would occur within sagebrush/grassland

- Most lynx activity is located in the Pintler and North Flint Ranges. Winter track surveys and lynx hair snares have noted little lynx activity elsewhere on the Forest.

- **Direct, Indirect, and Cumulative Effects Analysis**

Table (9). Canada Lynx Conservation Assessment and Strategy Standards; Conservation Measures Applicable to All Programs and Activities (LCAS, 7-16 to 17).

Standards	Pre-Treatment	Post-Treatment	Compliance
Large Scale Factors (7-16)			
Non-native Invasive Plant Species	Management activities should seek to minimize the loss or modification of lynx habitat	Management activities should seek to minimize the loss or modification of lynx habitat	Proposal would aggressively minimize loss of habitat with addition of aerial application

- There would be no direct effect to Canada lynx from spraying noxious weeds. There would be disturbance in areas of spray treatment, so these areas would be unavailable to Canada lynx during the time of the treatment. The majority of the disturbance would occur next to roads and trails. Controlling noxious weeds would help to maintain native vegetation throughout the Forest, which would help to maintain prey species and foraging opportunities.

- Cumulative Effects - Spraying of noxious weeds on the Forest would be in addition to spray programs off the Forest. This would increase disturbance throughout the area. It would also increase the areas where native vegetation would be maintained for both lynx and prey species. The proposed noxious weed control program would increase disturbance into areas that have not had disturbance in the past from weed control activities (aerial spray areas). This disturbance would be of short duration.

- **Determination of Effects**

- I have determined implementation of the proposed Federal Action **Is Not Likely To Adversely Affect** Canada lynx. My determination is based on the following rationale:

  1) The proposal is short-term duration in localized areas,

  2) Has little potential to impact denning or foraging habitat,

  3) Has little potential to impact prey species,

  4) Would help to minimize the loss or modification of lynx habitat.

- **Recommendations For Removing, Avoiding, or Compensating Adverse Effects**

  - None.

Bald Eagle (*Haliaeetus leucocephalus*)

- **Population and Habitat Status**

Table (10). Bald Eagle; Population and Habitat Status.

Bald Eagle Activity	Nest Site	Roost Site	Foraging Habitat
6 nests known on the B-D NF, numerous nests near the B-D NF	No – majority of treatment would occur within sagebrush/grassland	No – majority of treatment would occur within sagebrush/grassland	No – majority of treatment would occur within sagebrush/grassland

  - There are 6 known nests on the Forest: Wade Lake, Cliff Lake, Goose Lake, Elk Lake, Fish Creek Lake, and Francis Creek nests. Additional nests are located near the Forest on the Beaverhead, Big Hole, Jefferson, and Madison Rivers. Bald eagles winter in similar areas as well.

- **Direct, Indirect, and Cumulative Effects Analysis**

Table (11). Bald Eagle; management of bald eagle breeding territories.

Guidelines*	Pre-treatment	Post-Treatment	Compliance
Zone I – Nest Site Area; within ¼ mile radius around the nest			Very little potential for treatment activity due to little overlap with habitat
Permanent development and habitat alteration that may negatively affect the suitability of the breeding area should be avoided or prohibited within this zone			If weeds were discovered within this management zone, they would be treated after August 15.
Zone II – Primary Use Area; within ½ mile radius around the nest			Very little potential for treatment activity due to little overlap with habitat

Maintain habitat components and the ecological integrity of the nesting territory including currently used and potential nesting habitat			If weeds were discovered within this management zone, they would be treated after August 15.
Low intensity activities can occur. High intensity activities should not occur during the nesting season (2/1-8/15)			Small, low-density weed infestations would be treated. Large, high-density infestations would follow nesting season dates (after August 15).
Habitat alterations should be designed and regulated to ensure preferred nesting and foraging habitat characteristics are maintained			Treatment of noxious weeds maintains or improves habitat.
Zone III – Home Range; all potential foraging habitat within 2 ½ miles around the nest			Due to size of area there would be potential for weed treatment.
Maintain suitable foraging habitat, prey base, perch, and roost sites			Treatment of noxious weeds would maintain or improve habitat.
Habitat alterations should be designed to ensure the prey base and important habitat components are maintained or enhanced			Treatment of noxious weeds would maintain or improve habitat
Pesticides should not be used in a manner posing a hazard to bald eagles			All herbicides would be applied according to label instructions and specifications or Forest Service policy whichever provides the most protection.

*Montana Bald Eagle Working Group (1994)

- There would be no direct effect to bald eagle from spraying noxious weeds. There would be disturbance in areas of spray treatment, so these areas would be unavailable to bald eagles during the time of the treatment. The majority of the disturbance would occur next to roads and trails. Controlling noxious weeds would help to maintain native vegetation throughout the Forest, which would help to maintain prey species, nesting and foraging opportunities.

- Cumulative Effects - Spraying of noxious weeds on the Forest would be in addition to spray programs off the Forest. This would increase disturbance throughout the area. It would also increase the areas where native vegetation would be maintained for both bald eagles and prey species. The proposed noxious weed control program would increase disturbance into areas that have not had disturbance in the past from weed control activities (aerial spray areas). This disturbance would be of short duration.

- **Determination of Effects**

  - I have determined implementation of the proposed Federal Action **Is Not Likely To Adversely Affect** bald eagle. My determination is based on the following rationale:

    1) The proposal is short-term duration in localized areas,

    2) Has little potential to impact Management Zones 1 or 2,

    3) Has little potential to impact prey species,

    4) Would help to minimize the loss or modification of bald eagle habitat.

- **Recommendations For Removing, Avoiding, or Compensating Adverse Effects**

  - No treatment in Management Zones 1 or 2 until August 15 annually.

Mountain Plover (*Charadrius montanus*)

- **Population and Habitat Status**

Table (12). Mountain Plover; Population and Habitat Status.

Mountain Plover Activity	Nearest Active Population	Potential Nesting Habitat
Not Known on the B-D NF	South of Elkhorn Mountains, East & West of Bull Mountains, West of Tobacco Root Mountains and East of Highland Mountains	No – majority or treatment areas along travel routes (roads, trails)

- **Direct, Indirect, and Cumulative Effects Analysis**

  - There would be **No** effects to mountain plover as there is no known habitat on the Forest (Knowles & Knowles 1997).

- **Determination of Effects**

  - I have determined implementation of the proposed Federal Action **Would Nave No Effect** on mountain plover. My determination is based on the following rationale:

    1) There is **No** mountain plover habitat on the Forest.

- **Recommendations For Removing, Avoiding, or Compensating Adverse Effects**

  - None.

CONSULTATION

- Species list confirmation by e-mail with Anne Vandehey, July 30, 2001.
- Review by Beaverhead-Deerlodge NF Wildlife Biologists, March 1-15, 2002.

PREPARED BY:

/s/ Ron B. Wiseman

RON B. WISEMAN
Wildlife Biologist

LITERATURE CITATION

Knowles, Craig J. and Pamela R. Knowles. 1997. Mountain plover numbers, reproduction and habitat use in Montana: A summary of six years. Prepared for Montana Dept. Fish, Wildlife and Parks, Great Falls and Bureau of Land Management, Billings, MT. Fauna West Wildlife Consultants, Boulder MT. 22pp.

Montana Bald Eagle Working Group. 1994. Montana bald eagle management plan. Bureau of Reclamation, Billings, MT. 104pp.

Ruediger, Bill, Jim Claar, Steve Gniadek, Bryon Holt, Lyle Lewis, Steve Mighton, Bob Naney, Gary Patton, Tony Rinaldi, Joel Trick, Anne Vandehey, Fred Wahl, Nancy Warren, Dick Wenger and Al Williamson. 2000. Canada lynx conservation assessment and strategy. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management and USDI National Park Service. Forest Service Publication #R1-00-53, Missoula, MT. 142pp.

U.S. Fish and Wildlife Service. 1993. Grizzly bear recovery plan. Missoula, MT. 181pp.

U.S.D.I. Fish and Wildlife Service. 1994. 50 CFR Part 17 Establishment of a nonessential experimental population of gray wolves in Yellowstone National Park in Wyoming, Idaho, Montana, Central Idaho and Southwestern Montana; Final Rules. Federal Register. Vol.59, No.224. November 22, 1994. 60252-60281pp.

File Code: 2670
1950

Date: March 26, 2002

Route To:

Subject: Biological Evaluation – Noxious Weed Control Program EIS

To: Forest Supervisor & ID Team Leader – Leaf Magnuson

INTRODUCTION

The Regional Forester of the Northern Region has identified plant, bird, and animal species for which viability is a concern as Sensitive. Sensitive Species are those recognized on the Update of Northern Region Sensitive Species List dated March 12, 1999 (amended November 2000).

After review of existing element occurrence reports (Sensitive Species List and 2670 Files), general habitats most affected (sagebrush/grassland), and field reviews (summer 1987-2001 & winter 1987-2002), it was determined that the following sensitive species may occur in those habitats affected by noxious weed control methods. While the entirety of the Beaverhead-Deerlodge NF sensitive species list is considered, the following three species are discussed in detail:

MAMMALS:	Pygmy rabbit (*Brachylagus idahoensis*)
BIRDS:	Sage grouse (*Centrocercus urophasianus*), Columbian sharp-tailed grouse (*Tympanuchus phasianellus*)

Sensitive species on the Beaverhead-Deerlodge NF are displayed in Table 5.

PROPOSED PROJECT

The Beaverhead-Deerlodge National Forest proposes to use all appropriate methods of noxious weed (Table 1) control, including aerial application of chemical herbicides, prevention, detection, treatment, and monitoring in addition to chemical treatment. Noxious weeds do not follow ownership boundaries therefore Integrated Weed Management prescribes coordination between public and private land managers. Because herbicide treatment is already part of existing weed treatment we will compare proposed alternatives by methods of application.

Table 1. Montana State Noxious Weeds targeted on the Beaverhead-Deerlodge National Forest.

Common Name	**Scientific Name**
Category 1*	*noxious weeds currently established and generally widespread in many counties of the State
Leafy spurge	*Euphorbia esula*
Canada thistle	*Cirsium arvense*
Russian knapweed	*Centaurea repens*
Spotted knapweed	*Centaurea maculosa*
Diffuse knapweed	*Centaurea difussa*
Field bindweed	*Convolulus arvensis*
Whitetop (hoary cress)	*Cardaria draba*
Dalmation toadflax	*Linaria dalmatica*
St. Johnswort (goatweed)	*Hypercum perforatum*
Sulfur cinquefoil	*Potentilla recta*
Common tansy	*Tanacetum vulgare*
Ox-eye daisy	*Chrysanthemum leucanthemum*
Houndstongue	*Cynogbssum officinale*
Category 2*	*noxious weeds recently introduced or rapidly spreading from current infestation sites
Dyer's woad	*Isatis tinctoria*
Purple loosestrife (Lythrum)	*Lythnum salicaria, L. virgatum* and crosses
Tansy ragwort	*Senecio jacobia*
Meadow hawkweed complex	*Hieracium pratense, H. floribundum, H. piloselloides*
Orange hawkweed	*Hieacium aurantiacum*
Tall buttercup	*Rannunculus acris*
Tamarisk	*Tamarix* spp
Category 3*	*noxious weeds not detected or found only in small, scattered, Localized infestations
Yellow starthistle	*Centaurea solstitalis*

Common Name	**Scientific Name**
Common crupina	*Crupina vulgaris*
Rush skeletonweed	*Chondeilla juncea*
County Control*	*noxious weeds established for control by county weed boards
Yellow toadflax	*Linaria vulgaris*
Musk thistle	*Cardurus nutans*
Field scabious	*Knautia arvensis*
Black henbane	*Hyocyamus niger*
Burdock	*Arctium minus*
Common mullein	*Verbascum thapsus*
Bull thistle	*Cirsium vulgare*

The EPA has determined the risk associated with proper aerial application of registered chemical herbicides. EPA registered herbicides supply specifications for application on the label. The website: http://infoventures.com/e-hlth/ has an Environmental Health Reference and Resource Materials section where you can find this information.

Improper aerial application is not anticipated. All herbicide applicators whether Forest Service or contractor employees, will follow label instructions to prevent negative effects. Field inspectors will be on-site during all aerial applications to monitor compliance with label specifications and effects.

The Risk Assessment for Herbicide Use in Forest Service Regions 1, 2, 3, 4, and 10 and on Bonneville Power Administration Sites printed in 1992 provides detailed information about herbicide use. This large document is available in the project file at the B-DNF Supervisor's Office in Dillon. There is also a website address for that publication: http://www.fs.fed.us/foresthealth/pesticide/health.htm

Direct Control: Direct methods will be applied annually on 15 –16,000 (37%) of the 43,012 weed-infested acres on the Beaverhead-Deerlodge National Forest. This projection includes annual aerial application of herbicides on 9,000 acres and ground application up to 7,000 acres. Mechanical, biological and cultural treatments will be applied when practical and are included in the annual acres identified for treatment.

The proposal considers all EPA registered chemicals approved for weed control, including herbicides developed and approved for use in the future. Registered herbicides

are shown in Table 2. All herbicides would be applied according to label instructions and specifications or Forest Service policy whichever provides the most protection.

Table 2. EPA registered chemicals being considered for weed control on the Beaverhead-Deerlodge National Forest

Common Name	Trade Name
2,4-D	Hi Dep, Weedar 64, Weed RHAP
Chlorsulfuron	Telar
Clopyralid	Stinger, Reclaim, Transline
Dicamba	Banvel, Banex, Trooper
Glyphosphate	Roundup, Rodeo, Accord
Haxxzinone	Velpar, Velpar ULW, Velpar L, Pronone 10G
Imazapyr	Arsenal, Chopper, Contain
Metsulfuron methyl	Escort, Ally
Picloram	Tordon, Grazon, Access, Pathway
Pyridinecarboxylic acid	Pleateau
Sulfometuron methyl	Oust
Triclopyr	Garlon, Grazon
Adjuvants	
Surfactants	
Dye	

Some biological controls in use are: Knapweed gall flies (*Urophora affinis* and *U. quadrifasciata*), Knapweed gallfly (*Latin binomial*,), and Leafy spurge moth (*Apthona nigris-cutis*.) All biological agents would be released according to APHIS requirements, or Forest Service policy, whichever is more restrictive. New agents may be substituted if more appropriate, if current agents are not available or have been found ecologically harmful.
The proposal allows new sites to be treated as soon as they are identified. Mitigation measures for treatment apply to new sites as appropriate.

Indirect Control: Indirect methods comprise detection, prevention, and education. Survey, detection, and monitoring activities will be accomplished on about half of the infested acres every year. Prevention measures include OHV travel restrictions, vehicle cleaning, livestock management, and other related practices. Current education programs, publications, postings news releases, and cooperation with other agencies will continue until monitoring indicates a need for change. The acres and type of control measures implemented on National Forest System lands in this proposal are displayed in Table 3.

Mitigation measures and an aquatic monitoring plan are identified and will be utilized as appropriate for specific site conditions.

Selection methods for aerial application sites
The first test for aerial application is whether the chemical can be delivered to the target weed. If overstory vegetation prevents herbicides from getting to the weed then aerial application is not warranted. This primarily eliminates weed infestations under moderate to heavy forest canopy.

When a site is listed for potential aerial application it falls into one of the following categories:

1. The infestation covers a large area and would be most efficiently treated from the air. There is no acre limit for this decision, but these sites are generally over 20 acres with fairly dense weed coverage.

2. The infestation is located on rough, steep terrain preventing ground application and too dangerous for employees on foot.

3. The infestation is very remote requiring an inordinate amount of time for crews to arrive and apply ground treatment.

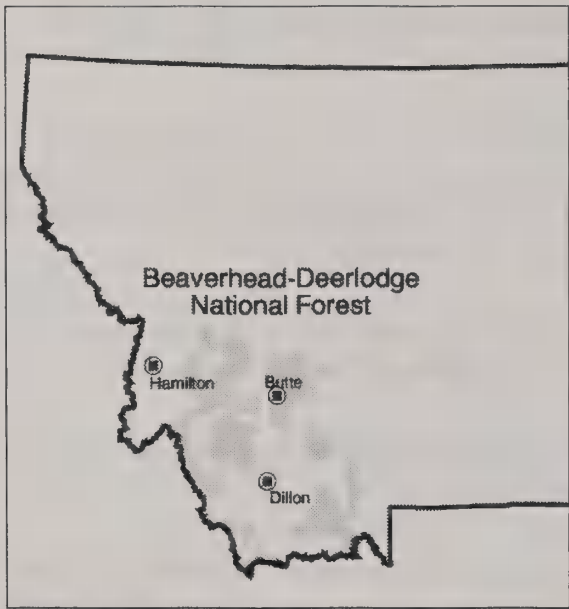
4. The potential for a weed infestation to logically fit into a coordinated weed control program with adjacent landowners. These sites might currently be treated by ground methods. They would only be more efficiently treated by air if adjacent non-Forest land were treated at the same time.

Table (3). Summary of the features of the Noxious Weed Project, Beaverhead-Deerlodge National Forest. February 27, 2002.

Features	Quantity
Biological Control	125 acres
Mechanical Control	35 acres
Ground Herbicide Application	6,831 acres
Aerial Herbicide Application	9,028acres
Total Annual Treatment	16,019 acres

Project Area

The proposal includes lands on the Beaverhead-Deerlodge National Forest. This is approximately 3.3 million acres of National Forest lands in Beaverhead, Deer Lodge, Granite, Jefferson, Madison, Powell, and Silver Bow Counties in Southwestern Montana.



SENSITIVE SPECIES

Pygmy rabbit. - Pygmy rabbits are dependent upon sagebrush, primarily big sagebrush (*Artemisia tridentata*), and are usually found in areas where big sagebrush grows in very dense stands. Tall, dense sagebrush clumps are essential (Orr, 1940 cited in McAllister, 1995). The preferred habitat in Montana appears to be gently sloping or level floodplains where adequate sagebrush and appropriate soils exist. However, many occupied sites have marginal sagebrush cover and shallow soils. These areas are generally associated with patches of tall, dense sagebrush and adequate soils. Areas of marginal sagebrush cover or stringers of sagebrush have been identified as important habitat features that allow movement into suitable habitat (Rauscher, 1997). The Horse Prairie region and Badger Gulch may be a stronghold for the species in the State (Rauscher, 1997). It is unclear if the population has remained stable or has varied since first reported in Montana.

Sage grouse. - Sage grouse, due to their dependence upon sagebrush-grassland habitat for food and cover, are limited in distribution to the range type dominated by sagebrush, principally big sagebrush (*Artemisa tridentata*), but also its related species (Klebenow 1972). Depend entirely upon forms of sagebrush, primarily big sagebrush (*Artemisa tridentata*), for food from October through May and for cover throughout the year. In spring, males prefer relatively open, rather than dense, sagebrush cover for strutting grounds. They may move up to 50 miles or more throughout the year (DeGraaf *et al* 1991). Population trend for sage grouse in southwestern Montana has been slowly downward for the past decade (Crowley & Connelly 1996). This is due to a combination of factors including, but not limited to loss of winter range, degradation of habitat and conversion of sagebrush habitat to agricultural use.

Columbian sharp-tailed grouse. – Columbian sharp-tailed grouse is a chicken-like bird, the smallest of the seven subspecies of sharp-tailed grouse. It has darker gray plumage, more pronounced spotting on the throat and narrower markings on the underside than other subspecies of grouse. Historically, these grouse were found west of the Continental Divide in Montana. The Beaverhead-Deerlodge National Forest has **no records of Columbian sharp-tailed grouse on the forest.**

Excessive hunting in mid-to-late 19th century is believed to be the major contributing factor to early extirpation of local populations and the initial reduction of the grouse's range. Conversion to agriculture of the grouse's preferred shrub-steppe, grassland and riparian habitat contribute to local population declines, along with habitat degradation caused by heavy livestock grazing.

This species inhabits mid to tall grasslands interspersed with scattered woodlands, arid sagebrush, brushy hills and edges of riparian woodland. They prefer habitats with several small openings, 1 to 10 acres in size, close together or a single large opening of 50 to 100 acres. In early spring males gather on dancing grounds to challenge nearby males and attract females. Most dancing grounds are used for only a few seasons, but some may be used year after year. In late summer and early autumn, sharp-tailed grouse can be found in open cover, grassy openings or in low, scattered brush. Later, grouse move to thickets and open woods, and in winter, to edges of brush, open woods or swamps. The grouse prefers tops of low to medium hills or ridges with short, sparse vegetation for courtship sites. Roosts are located in trees or shrubs in brushy cover. Nests occur on the ground among tall, rank grasses or in brushy or woody areas if grassland quality is poor. Nests may also occur in winter wheat or in residual cover of warm season grasses on north-facing slopes.

Food preferences include insects, rose hips, snowberries, wheat and other grains, leaves and buds of willow, aspen, cottonwood, alder and maple (Degraaf *et al.*, 1991). Weed infestations are having an impact on the types of habitat that Columbian sharp-tailed grouse use. A status review by the USFWS determined that some of the smaller, isolated populations are currently at risk of extinction, but there are numerous larger populations of the species that are relatively secure and possibly increasing.

For a complete life history discussion of all above mentioned species see BA/BE's 2670 Files, Beaverhead-Deerlodge NF Ranger Districts

EFFECTS

The following assumptions are the basis for the discussion of impacts of proposed noxious weed treatment:

1) Following the manufacturers label direction for application rates would not have any unacceptable (beyond those described by label) impact on wildlife species through direct contact, ingestion or contact with recently treated vegetation;

2) Following APHIS regulations would provide the limits to ensure that any bio-control agent would not impact native wildlife or habitat;

3) Noxious weeds provide neither the same food nor cover value of native vegetation. A noxious weed monoculture represents a loss of biodiversity;

4) The risk of allowing noxious weeds to spread into native habitats would be greater than any impacts to wildlife from regulated noxious weed treatment.

5) Those species that do not use sagebrush/grassland habitats would be fundamentally unaffected by noxious weed control activities.

Disturbance and displacement would occur within the treatment areas. This would have little persistent impact to the species associated with sagebrush/grasslands or riparian areas as most treatment would take place in areas that are already disturbed (i.e. roads, trails, timber harvest, administrative sites, campgrounds). These areas provide little effective sensitive wildlife species habitat.

Aerial spraying has the potential to displace sensitive wildlife species during the time of application. Disturbance would be very short term, as most application would take less than one day per treatment area. Treatment, however, would occur in areas not usually associated with human presence (reason for the aerial application).

Treatment areas would have a reduction in vegetative cover for a period of time after treatment. Habitat effectiveness of the areas treated would be reduced and sensitive wildlife species may be displaced until the native vegetation has recovered (next growing season for grasses, 5-10 years for forbs and fifteen plus years for sagebrush).

Reduction in habitat effectiveness would have the most affect on sage grouse (nesting/brooding), pygmy rabbit (yearlong) and Columbian sharp-tailed grouse (nesting/brooding). The current amount of habitat disturbed by weed treatment would have little impact on these species, as treatment areas are a very small portion of available sagebrush/grassland habitat, approximately 2%. Long-term effects (greater then 5 years) of noxious weed treatment would be an improvement in sagebrush/grassland habitat as treatment areas return to a more native habitat and weed infestation would be decreased within the affected habitats.

Cumulative Effects

Analysis area for cumulative effects is the entire Beaverhead-Deerlodge National Forest and adjacent private, State, BLM, and other Forest Service lands.

Activities that have occurred in the project area, are currently occurring, and that could occur in the future may in themselves have little impact on Sensitive wildlife species. When considered together, the effects may have a large cumulative impact to the species occurring in the area.

Past Activities:

Activities contributing to the existing habitat situation are timber harvest, livestock grazing, mining, and road/trail construction. Recreational activities (e.g. big game hunting, ATV use, hiking) and access management are additional activities influencing habitat security. As shown in the current Southwest Montana Interagency Visitor/Travel Map (East and West halves – 1996) and Beaverhead-Deerlodge National Forest Deerlodge Forest Area Forest Visitor/Travel Map (1996), various portions of the Forest are being managed with area restrictions. There are also many specific roads and trails with seasonal or yearlong motorized vehicle use restrictions.

Several timber sales and associated road construction projects have occurred in the past few decades within the analysis area. These timber sales were located mostly in lodgepole pine. Recently, areas of dead (insect killed) lodgepole have been entered. Douglas-fir and aspen stands have also been harvested. Total timber harvest on the Forest since 1970 has occurred over 63,261 acres with an additional 18,061 acres of post and poles projects.

There have been 6,441 miles of roads and 2,893 miles of trails built on the Forest.

Livestock grazing has occurred on the Forest for the past century. There are 257 active grazing allotments: 246 cattle and horse, 10 sheep and goat, and 1 bison in the analysis area.

Mining has been taking place on the Forest since the mid-1800s. There are currently 1,302 active mining operations on the Forest. The majority of the mining activity is located on the Jefferson Ranger District in the Boulder/Basin area and on the Pintler Ranger District.

The Forest Service built guard stations and campgrounds at various locations (see the above mentioned Visitor/Travel Maps). Dispersed recreation sites occur throughout the Forest.

Present Activities

Cattle and some sheep (Dillon and Madison RD) are grazing within the analysis area on the 257 active National Forest allotments. Vegetation monitoring demonstrates that the general condition of the allotments is good with specific riparian areas being poor. Uplands are generally in good condition. Grazing also occurs on State, BLM and private lands.

Noxious weed treatment occurs on approximately 6,900 acres annually within the Forest. Most activity is located near roads, motorized trails, campgrounds, and administrative sites. Counties, BLM, MFWP, and neighboring Forests have noxious weed treatment programs.

Mining activity in the area is sporadic and depends upon the current market value of minerals. Current levels of activity are occurring at a slow steady rate. Most activity is located on the Jefferson and Pintler Ranger Districts.

Timber harvest is occurring on the Madison (West Fork Madison/Standard Creek areas), Wisdom (Steel, Saginaw, Dry & Ruby Creek areas), Wise River (La Marche, Alder & Bryant Creek areas) and Pintler (South Boulder/Wyman Gulch, Coal Gulch and Montana State Prison areas) Ranger Districts. Montana Department of Natural Resources and Conservation (DNRC) has sales in or planned in the following areas: Blacktail Creek, Moore Gulch, Browns Gulch, Long Creek, Cottonwood Creek and Silver King Ridge. BLM has sales in or planned in the following areas: Lemhi Pass, Dice Creek, Badger Pass and Mussigbrod Creek. Post and pole harvest occurs at various locations on the Forest, BLM and State. Firewood gathering also takes place throughout the area.

Recreational use depends on the time of year. In general, recreational activity is moderate on the Forest. The Forest receives heavy use by hunters during the general rifle season.

Open motorized routes vary depending on the time of year because of seasonal motorized vehicle access restrictions (see the above mentioned Visitor/Travel Maps).

Reasonably Foreseeable Activities

For a complete list of foreseeable activities refer to List of Beaverhead-Deerlodge National Forest Ongoing Projects (2000), with NLAA Determinations and the most current quarterly Forest and BLM NEPA project lists. Subdivision development and house building in many areas adjacent to the National Forest would continue. Patented mining claim areas may be developed.

Effects:
Current trends in range management are for an improving riparian condition. Grazing management updates will be designed to improve riparian areas and maintain or improve upland conditions. This will generally result in the same or fewer numbers of livestock and maintaining or shortening the season of use. This would have a beneficial effect for wildlife and bird species.

Prescribed burning would restore early successional vegetation stages within the area. Fire dependent vegetation would benefit (i.e. aspen). Any improvement in aspen stand conditions would be beneficial to wildlife and bird species. Change to early successional stages of other vegetation would have limited effects on wildlife and bird species.

Timber harvest would restore some early successional vegetation stages within the analysis area. It would also help to restore and maintain aspen within the Forest. Any improvement of aspen condition would be a benefit to wildlife and bird species. Change to early successional stages of other vegetation would have limited effects on wildlife and bird species.

Mineral activity would likely occur at the current rate in the project area. This activity poses an impact on wildlife species by being unpredictable in nature. Roads needed to access claims increase vulnerability by easing access into areas. Mining activity has the potential to displace wildlife species out of preferred areas. Ground disturbance has potential to change habitat and provides a means for increased weed infestation. This would likely have an adverse impact to wildlife and bird species.

Reconstruction of campgrounds and trails, and reconstruction and surfacing of roads would not impact any new areas. This may increase the likeliness of use thereby increasing the amount of recreational disturbance in the area. Burbridge and Neff (1976) reported that slow moving vehicles on primitive roads were more disturbing to elk than rapid moving vehicles on an improved forest highway. Surfacing may help to improve the flow of traffic.

Recreational use/activity must be dealt with in two distinct ways: 1) legal use and 2) illegal use. Legal use of trails, roads, etc., is restricted during different seasons of the year. Impacts to winter range, calving areas, etc., can be kept to a minimum with use restricted at various times. Wildlife can change behaviors to avoid recreational use that occurs in a predictable nature (i.e. on open trails, roads, area). Ward (1976) observed that elk tend to be undisturbed by repeated events of a predictable nature such as vehicle traffic that does not stop. Legal use would have very limited effect on wildlife and bird species.

Illegal use of trails, roads, and restricted areas pose a great impact to wildlife species. This type of use not only destroys habitat (i.e. wet bogs, forage), but also displaces animals from preferred habitats. These areas on the Forest tend to be located away from designated open routes/areas. Wildlife species have changed their behavior to avoid areas with ATV activity. Surprise encounters with illegal use cause these species to flee secure types of area increasing their vulnerability. This type of activity combined with other activities (mining, house building, subdivision) poses a great cumulative impact to Sensitive wildlife and bird species.

Subdivision and house building pose the removal of habitat and an increase in disturbance throughout the area. People associated with these activities increase the likeliness of the before mentioned actions. They can also create a place/source of mortality and barrier to migration/free movement. An increased potential for noxious weeds occurs in these areas with associated ground disturbance.

Loss of habitat from any of the above mentioned activities and introduction of non-native species (wildlife and vegetation) would be the **greatest cumulative impact** to sensitive

wildlife and bird species. The proposal would help to lessen this impact by taking an aggressive approach to reduce non-native vegetation (noxious weeds).

DETERMINATION OF EFFECT

Table 5. - BIOLOGICAL RISK ASSESSMENT

Species	Probability of Effect +	Consequence of Effect +	Cumulative Effect +	Determination of Effect *
Western big-eared bat	Low	Low	None	No Impact
Wolverine	Low	Low	Low	No Impact
Fisher	Low	Low	None	No Impact
Northern bog lemming	Low	Low	None	No Impact
Pygmy rabbit	High	Low	Low	May Impact Individuals or Habitat, But Will Not Likely Contribute to a Trend Towards Federal Listing or Reduced Viability for the Population or Species
Northern goshawk	Low	Low	None	No Impact
Trumpeter swan	Low	Low	None	No Impact
Flammulated owl	Low	Low	None	No Impact
Burrowing owl	Low	Low	None	No Impact
Common Loon	Low	Low	None	No Impact
Black-backed woodpecker	Low	Low	None	No Impact
Sage grouse	High	Low	Low	May Impact Individuals or Habitat, But Will Not Likely Contribute to a Trend Towards Federal Listing or Reduced Viability for the Population or Species
Columbian sharp-tailed grouse	High	Low	Low	May Impact Individuals or Habitat, But Will Not Likely Contribute to a Trend Towards Federal Listing or Reduced Viability for the Population or Species
Harlequin duck	Low	Low	None	No Impact

+ See Attachment A for an explanation of effects

***Determination of Effect is based on the documents listed in Literature Cited & Bibliography**

CONSERVATION MEASURES

The following conservation measures are mandatory for a determination of **No Impact** or **May Impact Individuals or Habitat, But Not Likely to Lead to a Trend Toward Federal Listing or Reduced Viability for the Species** for Sensitive wildlife species:

None.

Prepared by:

/s/ Ron B Wiseman

RON B. WISEMAN
Wildlife Biologist

Literature Cited:

Burbridge, W.R. and D.J. Neff. 1976. Conconino National Forest-Arizona Game and Fish Department Cooperative Roads-wildlife study. *In* Proc. Elk-logging-roads Symp., ed. S.R. Hieb, pp44-57. Moscow: Univ. Idaho. 142pp.

Crowely, Caroline M. and John W. Connelly. 1996. Sage grouse populations and habitat trends in Southeastern Idaho and Southwestern Montana. Idaho Dept. of Fish and Game, Pocatello, ID. 205pp.

DeGraaf, Richard M., Virgil E. Scott, R.H. Hamre, Liz Ernst and Stanely H. Anderson. 1991. Forest and rangeland birds of the United States natural history and habitat use. Agriculture Handbook 668, U.S. Department of Agriculture Forest Service. 625pp.

Klebenow, D.D. 1972. The habitat requirements of sage grouse and the role of fire in management In Annual Roceedings Tall Timbers Fire Ecology Conference No. 12. Lubbock, TX. 305-315p.

McAllister, Kelly R. 1995. Washington state recovery plan for the pygmy rabbit . Washington Dept. of Fish and Wildlife. Olympia, WA. Pg9.

Rauscher, Ryan L. 1997. Status and distribution of the pygmy rabbit in Montana final report. Montana Dept. of Fish, Wildlife and Parks. Bozeman, MT. 19pp.

Ward, A.L. 1976. Elk behavior in relation to timber harvest operations and traffic on the Medicine Bow range in south-central Wyoming. *In* Proc. Elk-logging-roads Symp., ed. S.R. Hieb, pp32-43. Moscow: Univ. Idaho. 142pp.

Bibliography:

Allen, A.W. 1987. The relationship between habitat and furbearers. In Novak *et al.* Wild furbearer management and conservation in North America. Chapt. 18, pp164-179.

Armiger, Christine and Lindsey sterling. 1998. Utilization of nest trees and nest stands by northern goshawks in Southwestern Montana. Enviro. Field Stud. ENVS 429. Western Montana College of the University of Montana, Dillon, MT. Unpub. Report.

Barnett, J.K and J.A. Crawford. 1994. Pre-laying nutrition of sage grouse hens in Oregon. J. Range Manage. 47:114-118.

Burbridge, W.R. and D.J. Neff. 1976. Conconino National Forest-Arizona Game and Fish Department Cooperative Roads-wildlife study. *In* Proc. Elk-logging-roads Symp., ed. S.R. Hieb, pp44-57. Moscow: Univ. Idaho. 142pp.

Butts, Thomas W. 1992. Wolverine biology and management a literature review and annotated bibliography. USDA-Forest Service, Northern Region, Missoula, MT. 106pp.

Christy, Robin E.; Stephen D. West. 1993. Biology of bats in Douglas-fir forests. Gen. Tech. Rep. PNW-GTR-308. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 28p.

Crowely, Caroline M. and John W. Connelly. 1996. Sage grouse populations and habitat trends in Southeastern Idaho and Southwestern Montana. Idaho Dept. of Fish and Game, Pocatello, ID. 205pp.

DeGraaf, Richard M., Virgil E. Scott, R.H. Hamre, Liz Ernst and Stanely H. Anderson. 1991. Forest and rangeland birds of the United States natural history and habitat use. Agriculture Handbook 668, U.S. Department of Agriculture Forest Service. 625pp.

Dobkin, David S. 1994. Conservation and management of neotropical migrant landbirds in the northern Rockies and great plains. University of Idaho Press, Moscow Idaho. 220pp.

Drut, M.S., W.H. Pyle and J.A. Crawford. 1994. Technical Note: Diets and food selection of sage grouse chicks in Oregon. J. Range Manage. 47:90-93.

Gannon, Reese and Rowdy Brooks. 1998. Vegetation and physical features at northern goshawk (*Accipiter gentilis)* nesting sites in Southwest Montana. Enviro. Field Stud. ENVS 429. Western Montana College of the University of Montana, Dillon, MT. Unpub. Report.

Hayward, G.D. and J. Verner, tech. editors. 1994. Flammulated, boreal, and great gray owls in the United States: A technical conservation assessment. Gen. Tech. Rep. RM-253. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Experiment Station. 214pp.

Hornocker, M.G. and H.S. Hash. 1981. Ecology of the wolverine in northwestern Montana. Can. J. Zool. 59:1286-1301.

Hutto, Richard L. 1995. USFS Northern Region songbird monitoring program distribution and habitat relationships. USFS contract #R1-95-05, Second Report. University of Montana, Missoula, MT. 120p.

Klebenow, D.D. 1972. The habitat requirements of sage grouse and the role of fire in management In Annual Roceedings Tall Timbers Fire Ecology Conference No. 12. Lubbock, TX. 305-315p.

Mariani, J.; B. Ruediger; J. Taylor; C. Paige; A. Christensen; P. Dolan; R. Krager; S. Ritter; M. Hillis and D. Davis. 1994. Black-backed woodpecker, Northern Rockies. USDA-ForestService. Missoula, MT. 5pp.

Montana Bird Distribution Committee. 1996. P.D. Skaar's Montana bird distribution, Fifth Ed. Special Publication No. 3. Montana Natural Heritage Program, Helena. 130pp.

Patla, Susan M. 1997. Nesting ecology and habitat of the northern goshawk in undisturbed and timber harvest areas on the Targhee National Forest, Greater Yellowstone Ecosystem. Masters Thesis, Idaho State University, Pocatello, ID. 164pp.

Rauscher, Ryan L. 1997. Status and distribution of the pygmy rabbit in Montana final report. Montana Dept. of Fish, Wildlife and Parks. Bozeman, MT. 19pp.

Reynolds, Richard T., Graham, Russell T., Reiser, M. Hildegard and others. 1992. Management recommendations for the northern goshawk in the southwestern United States. Gen. Tech. Rep. RM-217. Ft. Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 90p.

Ruggiero, Leonard, F., Keith B. Aurbury, Steven W. Buskirk, L. Jack Lyon and William J. Zieinski, tech. editors. 1994. The scientific basis for conserving forest carnivores American marten, fisher, lynx and wolverine in the western United States. Gen. Tech. Rep. RM-254. Fort Collins, CO: U. S. Department of Agriculture, Rocky Mountain Forest and Range Experiment Station. 184pp.

Thomas, J.W. 1979. Wildlife habitats in managed forests the Blue Mountains of Oregon and Washington. Agriculture Handbook No. 553. Pacific Northwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture. Portland, OR. 512pp.

U.S.D.A. Forest Service. 1995a. Range Permit Reissuance-Black-backed Woodpecker Writeup. Prepared by M. Maj and M. Hillis, for Region One. Missoula, MT.

________________. **1995b.** Range Permit Reissuance-Sage Grouse Writeup. Prepared by M. Maj and J. Mariani, for Region One. Missoula, MT.

________________. **1995c.** Range Permit Reissuance-Townsend's Big-eared Bat Writeup. Prepared by K. Torquemada and M. Cherry, for Region One. Missoula, MT.

________________. **1995d.** Range Permit Reissuance-Trumpeter Swan Writeup. Prepared by M. Maj, for Region One. Missoula, MT.

________________. **1995e.** Range Permit Reissuance-Wolverine Writeup. Prepared by N. Warren, B. Paulson and J. Claar, for Region One. Missoula, MT.

Ward, A.L. 1976. Elk behavior in relation to timber harvest operations and traffic on the Medicine Bow range in south-central Wyoming. *In* Proc. Elk-logging-roads Symp., ed. S.R. Hieb, pp32-43. Moscow: Univ. Idaho. 142pp.

Attachment A

Probability of Effect on Species or Habitat:

LOW	No evidence of species or habitat.
MODERATE	Evidence of species or habitat. Species are highly mobile, low density; responds to a wide variety of habitats.
HIGH	Evidence of species or habitat. Species occupy a limited area; responds to a narrow range of habitats.

Consequence of Effect on Species and Habitat:

LOW	None or inconsequential effect (direct or indirect) on habitat or population.
MODERATE	Possible direct or indirect effects on habitat or population. Adverse effects can be mitigated by modifying action.
HIGH	Apparent adverse effects on habitat or population. Adverse effects cannot be removed by modifying action. Cumulative effects probable.

Likelihood of Cumulative Effects on Species and Habitat:

NONE	Past, present and future activities will not affect habitat or population.
LOW	Past activities or events have affected habitat or populations. Effects of present activities manageable by seasonal or spatial restrictions. Future activities are not likely to affect habitat or populations. No irreversible or irretrievable effects expected.
MODERATE	Cumulative effects are expected through time. Irreversible effects are manageable through special management actions. No irretrievable effects expected.
HIGH	Cumulative effects not controllable. Irreversible effects expected. Irretrievable effects probable.